

AGRICULTURAL CHEMICALS



In This Issue:

TVA REPLIES TO PETERS REPORT • USE OF BORON IN FERTILIZER • LOCUSTENING AGENTS FOR L&D • SAC ARMY MEETS IN MAY
SEC FOR CONTROL OF BUTYRADIANT FIBER • U.S.D.A. ORDERS LABEL CHANGES ON BHT • NORTH CENTRAL A&E MEETING
AFPC AND IFA ANNOUNCE PROGRAMS FOR ANNUAL JUNE CONVENTIONS • NEW PLANT DELAYS NOTED • SELECTED RESEARCH WORK IN SOUTH



Quality and Service

You are assured on two important points — even in today's abnormal market — when you deal with P. C. A.

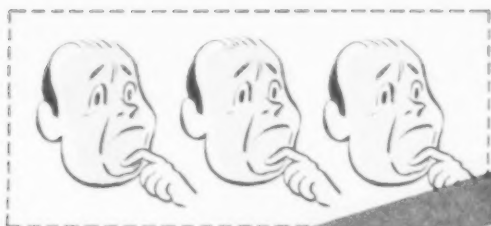
1. Quality . . . our Red Indian products are of unquestioned excellence.
2. Service . . . we make every effort to give you the service you want and deserve.

When better service is possible be assured P. C. A. will give it. Meanwhile your confidence, and your patience are greatly appreciated.

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CARLSBAD, NEW MEXICO

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Formulation Problems

Solved Profitably
with **ATTACLAY**



7 Today, Attaclay—the unique carrier and diluent—is used by practically all of the nation's larger producers of pesticide dust concentrates.

There are good reasons why. When free-flowing, highly sorptive Attaclay is in the formula, the capacity of mills—and that of the rest of the dust-handling equipment—goes up as much as 50%.

Attaclay transmits its own natural fluidity and lump-free fluffiness to the product, making each item more desirable—more sellable.

Which is another way of saying that Attaclay has proven its ability to reduce production costs, improve products, widen profit margins.

Blenders, too, recognize Attaclay's advantages. In the months to come—when they extend concentrates to field-strength dusts—Attaclay, applied as diluent, will continue to reshape ideas of what a fine, non-abrasive finished dust should be.

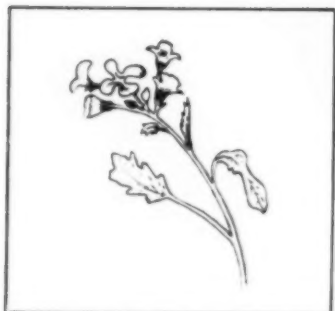
So, if you have a carrier or diluent problem and want to be sure of solving it *profitably*, discuss it with us. We will gladly provide a generous working sample of Attaclay and technical help.

ATTAPULGUS CLAY COMPANY

Dept. P, 210 West Washington Square, Phila. 5, Pa.

powco

2,4-D WEED KILLERS



The wild mustard weed, thief of the grain field, is no problem when POWCO BRAND 2,4-D is on the job. There's a Powell 2,4-D concentrate to fit your particular need—Ester, Amine, Salt or Acid—for bottle, can, drum or carton. POWCO BRAND 2,4-D is completely water soluble . . . does not precipitate in hard water and is equally adaptable to low gallonage sprayers or standard spraying equipment. Remember, 2,4-D is still not readily available. Review your needs—*now!*

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powco
BRAND
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KILLING POWER—THAT'S THE THING!

AGRICULTURAL CHEMICALS



THIS MONTH'S COVER

Of the millions of tons of commercial fertilizer manufactured in the United States each year, most of it is bagged for shipment to farms. Here is the other end of the line . . . fertilizer being dumped from multiwall paper bags into fertilizer drill on Long Island. (Photo courtesy of Bemis Bro. Bag Co., St. Louis, Mo.)

APRIL
VOL. IV

1949
No. 4

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A Monthly Magazine For the Trade

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how to feed a farm

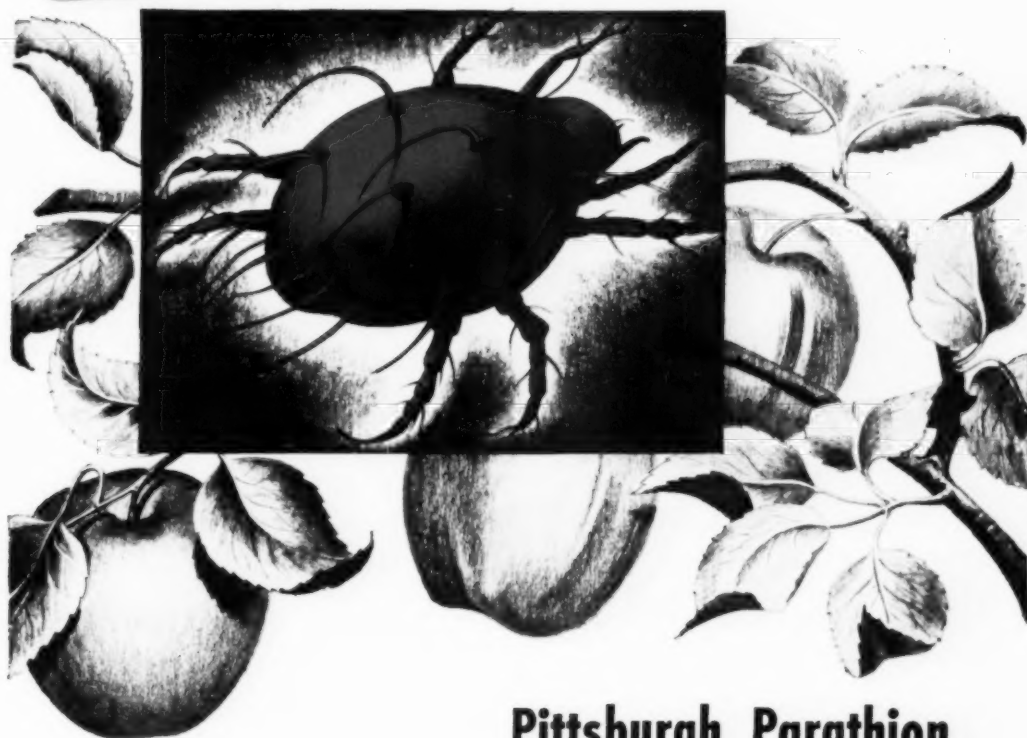
Put nitrogen on the menu. It fattens harvests and breadbaskets. It helps give the world something to taste besides hunger. Of all the commercial sources of nitrogen, none is more economical than ammonia.

CSC is producing anhydrous ammonia at its Dixie Plant at Sterlington, Louisiana. Working at capacity, Commercial Solvents Corporation is supplying the major part of its output to Gulf Coast manufacturers for conversion into nitrogen-rich fertilizers.



COMMERCIAL SOLVENTS CORPORATION, AGRICULTURAL DIVISION, 17 EAST 42nd STREET, NEW YORK 17, N.Y.

Banish this undesirable alien!



Pittsburgh Parathion destroys the European Red Mite

Pittsburgh Agricultural Chemicals

2,4-D Acid
2,4-D Amine Concentrates
2,4-D Sodium Salt Monohydrate
2,4-D Ester Formulated Concentrates
2,4,5-T Ester Formulated Concentrates
Phenolate-O
Phenolate-S
DNOC—Technical
Parathion—Technical
15% Parathion Wettable Dust Concentrate
25% Parathion Dust Concentrate
Alpha Naphthylthiourea (ANTU)
Iminol—A
Iminol—D
Quaternary Ammonium Compounds



Pittsburgh Parathion is probably the most potent insecticidal chemical known. In addition to its effectiveness against the European red mite and other arachnids, Parathion appears to control a wider range of insect enemies than any other compound now in general use.

Pittsburgh Agricultural Chemical Company is one of the few basic producers of this chemical. It is available in 25% dust concentrate and 15% wettable dust concentrate, chemically and biologically standardized. Full technical information about its characteristics and methods of application is available in bulletin No. 106. Ask for it, without any obligation.

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LATEX VL 600 . . . A film forming, highly adhesive, non-injurious plastic for many horticultural purposes.

n.i.x. . . . A water soluble contact herbicide for pre- and post-emergent weeding.

p.e.p.s. . . . A fungicidal "sticker" for use in many spray mixtures.

z.a.c. . . . A zinc carbamate complex. Fungicide for fruits, vegetables, and ornamentals. Ideal for use with Good-rite p. e. p. s.

z.i.p. . . . A highly effective deer repellent. Specifically formulated to prevent feeding damage. Proved in extensive tests by game authorities.

Every one of these Good-rite chemicals has been tested and proved. Find out how they can help broaden your line—increase your sales and profit opportunities. Full

information and prices upon request. Please write Department AG-3, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

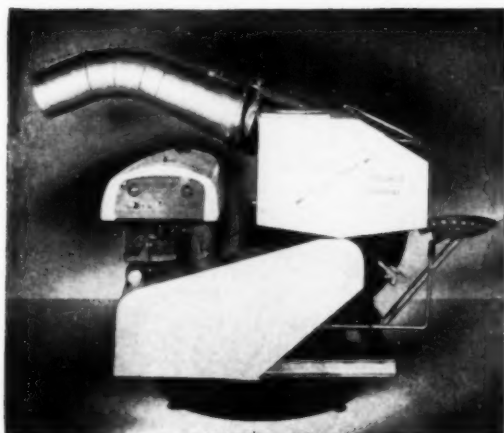
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GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

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AGRICULTURAL CHEMICALS

For Every Spraying Program . . . All-Purpose **LAWRENCE**



FORD ENGINES

These heavy-duty sprayers now have dependable rugged Ford engines. Ford dealers are everywhere, with the facilities for keeping the engine right on the job.

L-40 MODEL FILLS NEEDS FOR LIGHT, POWERFUL MIST SPRAYER

When the spraying program is not large enough for the efficient operation of the L-80 heavy duty mist sprayer, the 700-pound compact Lawrence L-40 Aero-Mist Sprayer is the ideal unit. The L-40 can be operated from the back of a pick-up truck or trailer . . . and the operator can aim the directional air nozzle in any direction.

AERO-MIST **SPRAYERS**

The New Improved L-80 AERO-MIST Sprayers

In this one fast, easy-to-operate sprayer is the modern means of pest, disease, and weed control! Unequalled in performance, the Lawrence L-80 Aero-Mist Sprayer handles *all* types of insecticides, fungicides, and weedicides . . . protects public health and comfort by helping to control flies and mosquitoes . . . gets at all leaf-eating insects, weeds, and plant diseases . . . thoroughly covers the tallest trees and lowest crops—and has the lowest operating costs in labor and materials.



THE LAWRENCE *AERO-MIST* **SPRAYER CO.**

"LAWRENCE"
*The Name
To Remember in
Mist Sprayers*

To: THE LAWRENCE AERO MIST SPRAYER CO.
18W Federal St., Greenfield, Mass.

Please send me complete details on the:

- ☐ L-80 heavy duty Lawrence Aero-Mist Sprayer
☐ L-40 light-weight Lawrence Aero-Mist Sprayer

Name

Address

City and State



Chemical weed control on the farm is here to stay. The last few years have proved that! But those years have also proved that *quality* is the biggest factor in successful weed control.

Dow Weed Killers offer you the tops in quality—the maximum in customer satisfaction. Each one has been carefully developed in Dow's own laboratories, carefully, thoroughly tested. They are Dow products from the initial research right down to the label on the can—quality all the way. Your customers know that they can depend on the famous Dow Diamond—the trademark of chemical quality.

To jobbers and dealers interested in *good* weed killers, Dow offers a complete line of *tested, proved* products—the *right* weed killers for a host of weed control problems. Ask your nearest Dow office or write direct to Dow for complete details on this quality profit line.

DOW—NO. 1 IN WEED KILLERS

... the place where quality counts!

2-4 DOW WEED KILLER, FORMULA 40—Widely acclaimed as the finest amine salt weed killer on the market. Works equally well in hard or soft water. Ideal for low volume spraying.

ESTERON 44—A powerful 2,4-D ester formulation especially effective against many hard-to-kill perennial weeds.

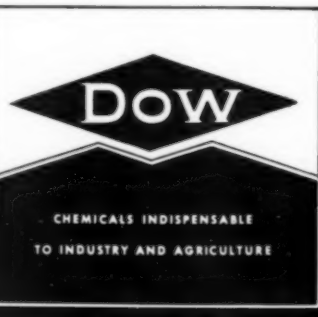
ESTERON 245—A new weed killer, close cousin of 2,4-D, but more effective on woody growths. Often used in mixture with Esteron 44.

DOW SELECTIVE WEED KILLER—A dinitre formulation highly useful on flax, peas and small grains interplanted with legumes such as clover and alfalfa.

DOW CONTACT WEED KILLER—"Chemical mower" for weeds in waste areas, along ditch banks, highways and fences. Kills most annuals and grasses but leaves roots to prevent erosion.

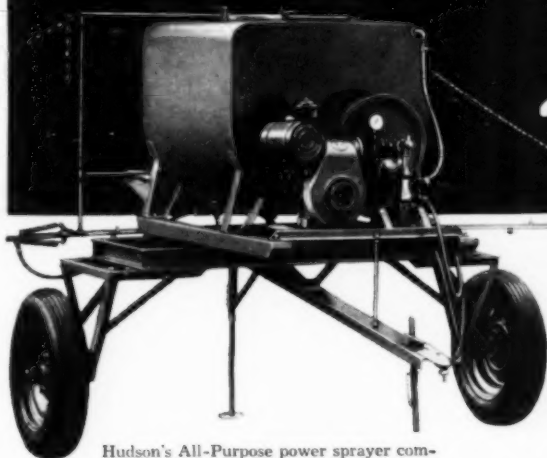
USE DEPENDABLE DOW AGRICULTURAL CHEMICAL PRODUCTS

WEED AND VINE KILLERS • INSECTICIDES • FUNGICIDES
SEED PROTECTANT • PLANT GROWTH REGULATORS
GRAIN AND SOIL FUMIGANTS • WOOD PRESERVATIVE



BUY HUDSON

...Be Sure!

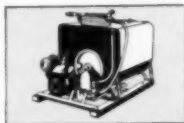


Hudson's All-Purpose power sprayer combination: skid mounted sprayer on Adapto Trailer with "No-whip" MULTI-BOOM.

Be Sure your power sprayer has all these features!



NEW HUDSON "ADAPTO" TRAILER, with tread adjustable from 52" to 84". Clearance 30".

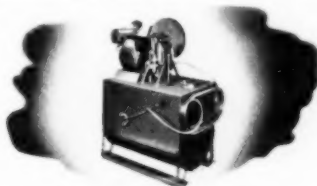


SKID MOUNTED—Haul it any way you want: truck or trailer, tractor or jeep.

Hudson Power Sprayers are **ALL-PURPOSE**... for weed killing... for spraying livestock and fruit... also white-washing and cold water painting.

See the complete Hudson sprayer and duster line. Small household sprayers... compression sprayers... wheel-mounted hand and power sprayers... many other types including those illustrated.

- Be sure... it's an **all-purpose** sprayer! HUDSON sprayers can be used year after year for any spray job... for new chemicals... new methods!
- Be sure... it has full pressure range. Hudson Power Sprayers have enough pressure for any farm spraying job. 0-350 lbs. pressure.
- Be sure... it's a **piston pump** sprayer! Hudson sprayers have no leather to wear out... give longer service.
- Be sure... the boom is **non-corroding**! Hudson booms are all-brass, hose is oil and chemical-proof.
- Be sure... the boom is "**whip-free**." Hudson "no-whip" Multi-boom sprays evenly... will not snap.
- Be sure... it has mechanical double agitation. Full strength solution at all times in Hudson Power Sprayers!



HUDSON POWER SPRAYER ON SKIDS

Even when the ground you cover is rough, you'll find this skid-mounted sprayer safe. Compact design permits ease of operation on tractor or bed of truck or trailer. 2½ or 5 g.p.m. discharge from 50, 100 or 150 gal. tank. Oil and chemical-proof high pressure spray hose.



HUDSON POWER SPRAYER ON TIRES

Tinklen bearing full pneumatic-tire wheels... don't injure sod. Low center of gravity helps prevent tipping on uneven ground. 2½ or 5 g.p.m. discharge from 30 or 50 gal. tank. Oil and chemical-proof high pressure spray hose. Tractor hitch at low cost.

H. D. HUDSON MANUFACTURING COMPANY

SPRAYERS AND DUSTERS • HAY TOOLS AND BARN EQUIPMENT • LIVESTOCK EQUIPMENT
POULTRY EQUIPMENT • FARM VENTILATION EQUIPMENT



Send for the free, helpful "Power Sprayer Manual." Full details on full line of Hudson Sprayers and Booms.



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My regular dealer is _____

INTRODUCING

CPR

FOR MULTI-PURPOSE

DUST BASE



USE IN TRUCK FARM INSECT CONTROL

After five years of field testing in fifteen states, U. S. Industrial Chemicals is proud to present an outstanding new insecticide dust base—CPR. These tests proved that CPR Dust Base Insecticides control a wide range of insects which attack truck crops and vegetable and flower gardens. In addition, they proved that **CPR leaves absolutely no toxic residue harmful to humans.**

CPR Dust Base contains piperonyl cyclonene, pyrethrins and rotenone. It offers the advantages of effectiveness, safety, economy and convenience.

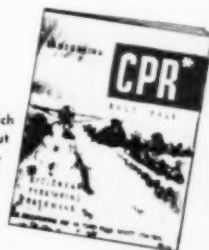
EFFECTIVE—CPR Dust Base makes possible the manufacture of insecticides which effectively control most species of insects attacking truck crops.

SAFE—Truck farmers and home gardeners may use insecticides made from CPR Dust Base with absolute safety to both user and ultimate consumer.

CONVENIENT—CPR Dust Base provides a mixture of all ingredients necessary for an effective dust combination. The physical properties are such that it blends readily with all commonly used diluents.

ECONOMICAL—CPR is low in cost and its preparation is simple and inexpensive. CPR is a uniform blend of active insecticidal ingredients, and mixing it with diluents and fungicides presents no problems.

Formulating Neoprene Sprayer and Chemical Division,
Food Machinery Corporation



Write for the free booklet which gives complete information about U. S. Industrial Chemicals' remarkable new product—CPR.

U.S.I

INDUSTRIAL CHEMICALS, INC.

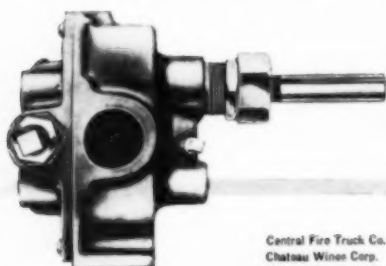
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Branches in all Principal Cities

It is now a matter of record

OBERDORFER

is North America's Agricultural Spray Pump Leader



Should anyone in agriculture have any question about the superiority of Oberdorfer in the pressure pump field we request they examine the following list of Industrial accounts who purchased these pumps last year — for continuous service.

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Allied Chemical and Dye Corp.
American Cyanamid Co.
American District Telegraph Co.
American Felt Co.
American LaFrance Foamite Corp.
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American Locomotive Co.
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Automatic Sprinkler Corp. of America
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Better Packages Inc.
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Buffalo Springfield Roller Co.
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Carrier Corp.
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Ingersoll Rand Co.
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Link Belt Co.
Maryland Drydock Co.
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Ohio Edison Co.
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Pennsylvania Power & Light
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Prosperity Co.
Revere Copper & Brass Co.
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Scripps Engine Co.
Seiberling Rubber Co.
Service Station Equipment Co. Ltd.
Shell Chemical Corp.
Standard Oil Co.
Stokes, F. J., Machine Co.
Struthers Wells Corp.
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Textile Machine Works
Thompson Products, Inc.
Tide Water Associated Oil Co.
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Wheeling Steel Corp.
Will & Baumer Candle Co.
Worthington Pump & Machinery Corp.
York Corp.

Here is why—Oberdorfer bronze Rotary Gear Pumps are recognized to be the standard agricultural Spray Pumps.

- 1 We have 350 sizes and styles of pumps scientifically adapted for spraying any crop or any livestock for whatever purpose anywhere.
- 2 We have outsold the entire agricultural spraying market 10 to 1 throughout North America.
- 3 Our pump distribution has been world wide for over 50 years.
- 4 We have manufactured millions of pumps since our first one in 1896.
- 5 Our prices are low because of our lengthy experience and high production.
- 6 Our pumps have been approved by the eight regional spraying conferences in the United States and Canada during the past two years and dozens of state and local conferences.
- 7 We have operated a farm of several hundred acres for experimental spraying investigation as it concerned our pumps.
- 8 We have sprayed, at no cost to the farm owners, thousands of acres of crops, for further proof of the soundness of our present pump designs and their improvement.
- 9 We have submitted pump samples to and worked closely with every state agricultural college and major agricultural chemical manufacturer to be certain that our pumps were adapted to their many developments.
- 10 Our executive Vice President, Mr. Del Digney, is the director of the Oberdorfer Pump Division and a graduate of the New York State College of Agriculture at Cornell University. During the past two years he has traveled over 100,000 miles through every State in the Union and most of the Canadian Provinces to check thoroughly upon the field operation of our pumps in every major phase of agriculture in North America for the express purpose of maintaining and continuing our established spray pump leadership.

AGRICULTURAL PUMP DIVISION • OBERDORFER FOUNDRIES, INC. • SYRACUSE, N. Y.

OBERDORFER BRONZE
AGRICULTURAL PUMPS

DEPENDABLE



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PACKAGED INSECTICIDES**

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GEIGY D-30

For use in preparing insecticides for control of a variety of agricultural and household pests.

**GY-BEN
(BENZENE HEXACHLORIDE)**

A solution containing 30% Geigy DDT (by weight) for dilution with liquids, to control flies, mosquitoes, gnats, bedbugs, cockroaches and fleas.

GEIGY PARATHION

Benzene hexachloride formulations containing 25% and 6% gamma isomer.

GESAROL* VD-50

For use in the preparation of dusts and sprays for a diversified list of insects on fruits and vegetables.

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(CHLORINATED CAMPHENE)**

A finely-ground powder containing 50% Geigy DDT. For general agricultural use after addition of diluents to formulate DDT dusts.

GEIGY PURIFIED DDT

A dust base containing 40% chlorinated camphene primarily for use in preparing dusts for cotton-pest control.

METHOXYCHLOR 50%

For use in the preparation of special DDT dusts or sprays for use on tomatoes and cucurbits.

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(INSOLUBLE COPPER)**

For use in the preparation of either sprays or dusts for agriculture, including sprays for the control of flies on livestock and in buildings.

A chemically stable insoluble basic copper sulphate containing 53% metallic copper for use in preparing sprays or dusts.

You can specify any of these dependable Geigy products with full confidence that they will do their part in justifying the claims you make for your insecticides and fungicides. Your inquiries are invited.



*Reg. U. S. Pat. Off. Insecticidal Compositions containing DDT are covered by Reissue Patent No. 22,922

GEIGY COMPANY, INC.
89 BARCLAY ST. NEW YORK 8, N. Y.



Crag

Trade-Mark

fungicides offer new **PROFIT POSSIBILITIES** in the farm market

Add to your list of agricultural chemicals Crag Fruit Fungicides and Crag Potato Fungicide. These chemicals give consistent disease control, assuring better yields and more marketable products.



Crag Fruit Fungicides (341B and 341C) give outstanding control of cherry leaf spot and apple scab. They produce healthier foliage and better quality fruit and have these *other* sales advantages:

- Easy to dilute and apply
- Require no special additives
- Minimum toxicity hazard. No residue problem
- Unusually good spreading and tenacity
- Compatibility with most insecticides
- No seasonal or temperature limitations



Crag Potato Fungicide (658) gives dependable control of early blight and late blight. It can be used as a spray or as a dust. It is readily dispersed in spray tanks—no additives are needed. This fungicide has these *additional* sales advantages:

- Chemically stable on foliage and in storage
- Weather resistant
- Compatible with DDT
- Easily formulated

Availability: Crag Fruit Fungicides and Crag Potato Fungicide are available from leading agricultural chemical distributors. Ask your distributor for samples and further technical information or write direct to us.

"Crag" is a registered trade-mark of C&CCL.

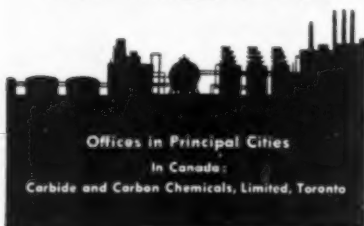
Producers of Agricultural Chemicals— including:

Crag Turf Fungicide—
for treatment of "dollar spot."

Crag Fly Repellent—
for protection of livestock.

CARBIDE and CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation
30 East 42nd Street **UCC** New York 17, N. Y.



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In Canada:

Carbide and Carbon Chemicals, Limited, Toronto

Your Union Multiwall Specialist

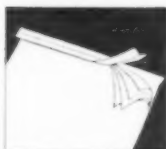
**Knows many ways to cut
packaging costs**

HOW LONG has it been since an *expert* analyzed your packaging methods?

Recent improvements in packaging methods and materials now make Union Multiwall Bags the preferred packaging for many different commodities . . . over 300 in all. They speed up packaging, cut labor and shipping costs, guard against contamination.

Even if you're now using multiwall bags, the Union Multiwall representative who calls on you can give you new ideas that may save you money. For he is backed by the specialized packaging knowledge of America's largest maker of paper bags—with its own forests, the largest completely integrated Kraft pulp-to-bag plant in the world, and skilled engineers and designers.

Let him show you how Union resources and packaging experience can help you!



Multiple Protection



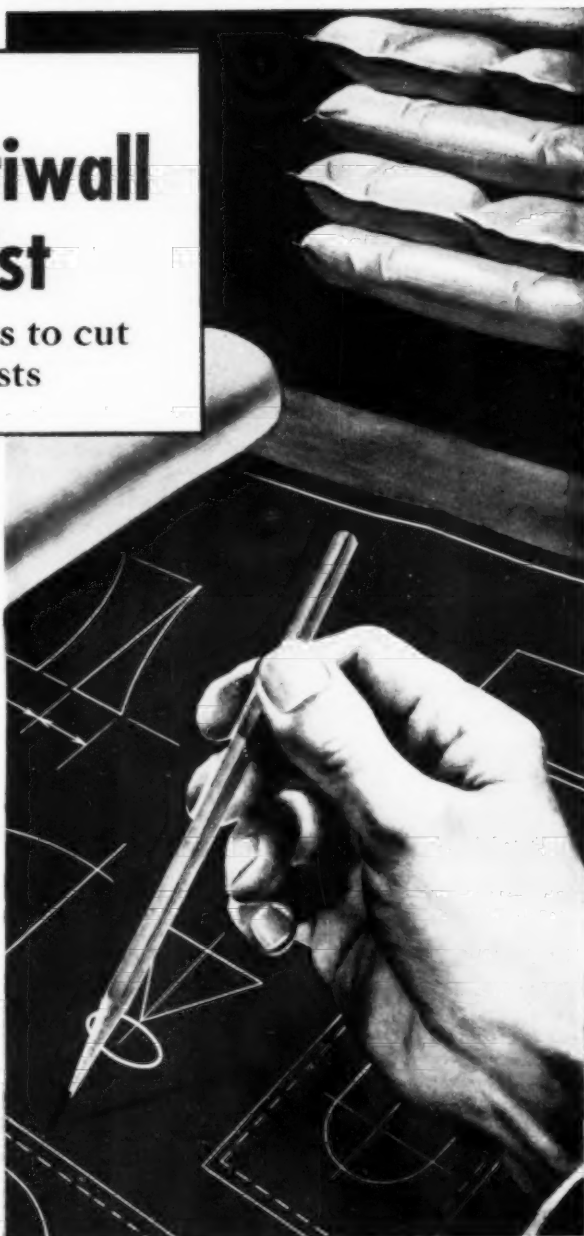
Opens Easily



Prevents Siftage



Empties Clean

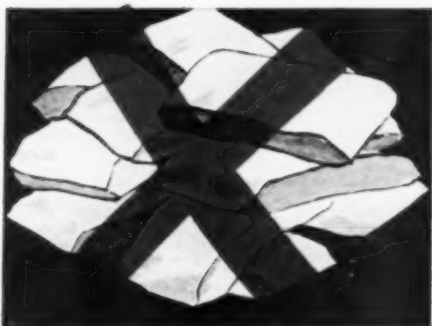


UNION Multiwall Bags

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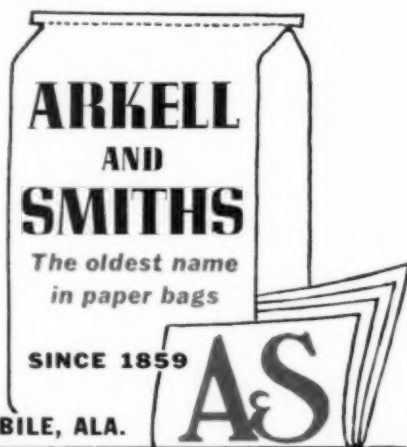
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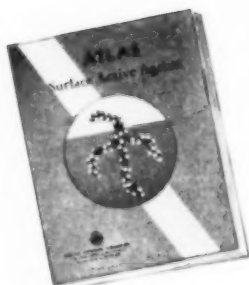
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(Liquid Amine Salt) now contains a special ingredient to keep it from precipitating in most hard waters

● Last year our Stantox field men in hard water areas experienced one difficulty with Liquid Amine Salt 2,4-D sprays — the 2,4-D had a tendency to precipitate from the solution in the spray tank. So this year you'll find our Stantox "64" 2,4-D contains a hard water inhibitor to keep it from precipitating in the hardest waters... a selling point that will come in handy in this year's highly competitive 2,4-D market.

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"70"**

(Sodium Salt
Powder)

To round out the Stantox 2,4-D line, Stantox "70" can be used either as a dust or spray.

2,4-D

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STANDARD AGRICULTURAL CHEMICALS, INC.

1301 JEFFERSON STREET, HOBOKEN, NEW JERSEY

THE EDITOR COMMENTS

STATING that "criticisms of TVA fertilizer operations do not stand up in the face of the facts," an answer by TVA to the recent critical report of Paul O. Peters to the House Small Business Committee, labels the Peters report "inaccurate and misleading." The statement by the Tennessee Valley Authority in defending its fertilizer operations makes the point essentially that "TVA is an experimental and not a commercial fertilizer producer." On the basis of its "experimental" character, TVA explains the reasons how and why it spent fifteen million dollars and took in only eleven. The four million dollar loss must be by the nature of the project and specific directives of Congress be charged against research and development of new and better fertilizers, according to the contention of TVA.

Taken as a whole, TVA presents what appears to be a plausible and convincing answer to parts of the Peters criticism. But its answers would appear to hinge, in our opinion, more on technicalities, — on interpretation of Congressional intent, on the exact wording of the TVA Act, — than to comprise a genuine rebuttal of the charges. Although the project is held to be strictly "experimental," much is made of the failure to set up suitable distribution arrangements through industry of fertilizers in commercial quantities, and of resale restrictions on distributors. In spite of these "experimental" contentions, we are still left with the feeling that this is just a plain government-operated fertilizer plant, and that this research angle and quotations from the law represent handy excuses rather than valid reasons for a four million dollar operational loss at the customary government expense.

With one point in particular in the TVA answer, we take sharp exception. It is the usual basically faulty reasoning of bureaucrats and government do-gooders. TVA

states: "TVA's obligation is not to the distributors of fertilizer but to the users of fertilizer, the farmers." We beg to correct TVA and any other government agency which has any such mistaken idea. Its obligation is not to any class or group, be they farmers, plumbers, or bricklayers. Its obligation is just as much to the fertilizer distributor as it is to the farmer. In fact, its obligation is to every damned tax payer and citizen in the country. Laws are not for the sole benefit of any class or industry, but for the entire nation. In this sentence, TVA weakens its case, which in our opinion still stands a long way from being proved.

THE possible arrival of "synthetic pyrethrum" was heralded in a recent Bureau of Entomology and Plant Quarantine announcement which reported the findings of U.S.D.A. research on the subject. In addition to the well-known pyrethrins, formerly thought to be the sole active insecticidal principles of pyrethrum, it was discovered by the Department investigators that there are two other esters equally active. These have been termed "cinerin I" and "cinerin II." Actually, the complex synthesis resulting from the years of research headed by Dr. F. B. LaForge, has produced an ester, an isomer of cinerin I, which has shown insecticidal properties equal to the natural esters of pyrethrum flowers, and with minor chemical substitutions, an effectiveness six times that of pyrethrum esters.

Looking at it from a realistic point of view, it would appear that this may be the long-sought "synthetic pyrethrum," a fanciful term which many thought might never be realized. At any rate, the process is being patented by the Bureau of Entomology and Plant Quarantine for public use. If practical commercially, the effect of this development in the insecticide field could become revolutionary.

Coming as it does at a time when public authorities and processors of foodstuffs are seeking insecticides which present no problems involving residual toxicity, such as attend the use of chlorinated insecticides, an inexpensive "synthetic pyrethrum" could easily develop into a major product in the pesticide world.

As an aside to this news, a dispatch from Kenya, East Africa, where most of the world's pyrethrum is grown, reports that production of pyrethrum flowers will be doubled in 1949. This announcement has been made following the recent visit to the United States of a Kenya delegation which persuaded the American industry to agree to place advance contracts for 1949 crop pyrethrum at new and higher prices.

Although no one knows just how the synthetic vs. natural pyrethrum may stack up in the future, the synthetic product no doubt will have a long road to travel before it reaches the point of affecting seriously the import of flowers from Africa.

AMERICA is slowly being poisoned by DDT! In sensational style reminiscent of yellow journalism of yesteryear, one Albert Deutsch in the **New York Post**, a daily tabloid, recently told how mass poisoning of America by DDT is going on while the USDA, and especially the Food & Drug Administration, twiddles its thumbs and engages only in "desultory research." The so-called "Virus X" disease which is supposed to have swept parts of the nation last year has also been unmasked. It is none other than DDT poisoning. This, according to Mr. Deutsch, is the positive conclusion of one Dr. Morton S. Biskind who "has observed hundreds of cases of DDT poisoning at first hand." His findings "indicate that tens of thousands, perhaps hundreds of thousands and **even millions** of Americans are undergoing slow poisoning from DDT."

This type of article in a daily newspaper can accomplish four main results: (1) its sensational slant gets the writer on the front

page and sells newspapers; (2) it scares hell out of a lot of people; (3) it makes USDA and FDA hot under the collar, knowing as they do that they have had this problem under expert scrutiny for several years; (4) it encourages publicity-seeking legislators to introduce all sorts of ill-advised and screwy laws.

With the DDT rumblings of the past few months, the action of FDA on milk barn spraying, and the activity of large food processors, we suppose that a sensational "news" story by some enterprising reporter has been inevitable and just a matter of time. But, Government officials have had the DDT problem well in hand and the charge of being "desultory" is completely false. The uninformed may be impressed, but we can see naught but possible hasty and panicky action, and an upset applecart in the way of any orderly solution of the problem, — a problem which has been grossly exaggerated here obviously to make sensational news.

SOME very good advice is given in the April issue of **Farm Journal** which discusses the new insecticides from a toxicological standpoint, and presents in plain talk the facts concerning most of the newer materials. "Follow those directions on the label—and no experimenting," the article says. "Read the labels carefully. Read them twice. Manufacturers stake their reputation on the labels . . . follow those directions and don't use the material for anything not recommended." It continues, "Don't be scared—be careful."

In addition to reading labels, the user is advised to consult with the county agent whose information will fit the needs of the locality. "If he doesn't know, he knows where to get it in a hurry," the **Journal** says.

This, it seems to us, is just the type of information that the user needs, and our hats are off to any and all publications or radio stations which seek to impress farmers of the importance of reading and heeding all labels on pesticides.



Importance of Boron in

FERTILIZER

by

James A. Naftel

Pacific Coast Borax Co.,
Auburn, Alabama

The growing list of plant food elements which are contained in complete fertilizers, manufacturers of fertilizers are now adding boron as a trace element along with copper, manganese, zinc and others.

Although boron is a relatively new member of the plant food family, it has been used as a household and industrial chemical for many years. Its use in fertilizers began only about 15 years ago, and in the meantime, worldwide research has indicated that many crops on many types of soils require boron fertilization to avoid deficiency diseases. It has also revealed that boron is as essential as are nitrogen, phosphorus, potassium, calcium and other plant food elements. The difference be-

tween the need for boron and other primary plant foods is one of quantity only . . . only a trace of boron is required in most cases.

Why does boron present a problem today when only a few years ago it was unheard of as a plant food? Soils in humid regions are depleted of boron by leaching or washing out by rains and by crop removal, and little or no boron is contained in the present-day fertilizer materials which are of higher analysis and purity. Thus it

becomes necessary to add boron to fertilizers to compensate for the continual removal of boron through natural means. It is an interesting fact that until quite recently the boron content of plants and soils was overlooked by the analytical chemist, since the ordinary chemical determination did not include boron. Methods are now available to chemists whereby traces of boron may be determined accurately in soils and crops.

Recognizing the necessity for fortifying their mixtures with boron, fertilizer manufacturers are now adding borates to make better balanced and more complete plant foods. However, there are some problems involved in the manufacture of borated fertilizers, since soil

and crop requirements and tolerances vary widely. Organic and heavy clay soils and crops like beets and alfalfa require relatively large amounts of boron, while sandy soils and such crops as cotton, beans, and tobacco have lower requirements and tolerances of boron.

These variations in crop and soil tolerances of boron put before fertilizer manufacturers the problem of controlling the boron content of fertilizers. Some manufacturers have resorted to custom mixing to include the desired amount of boron in fertilizers, although this is costly in time and labor. Special crop grades of fertilizer such as 0-12-12 plus borax, 2-12-12 plus borax, and 0-12-20 plus borax, which are currently being made for alfalfa, offer another solution for the proper use of boron in fertilizer.

A recent development which has been adopted by several large fertilizer manufacturers, is the practice of adding 5 to 10 pounds of borax per ton of fertilizer. This follows the suggestion of New Jersey and South Carolina Agricultural Experiment Station officials who proposed the addition of small amounts of borax to all fertilizers as a means of avoiding borderline cases of boron deficiency. Crops which have higher boron requirements would be treated with special crops fertilizers containing much larger amounts of boron.

There is increasing interest in and use of mixtures of trace elements including boron, copper, manganese, and zinc, which are in turn mixed in the complete fertilizer. These grades, termed "mineralized fertilizers," have given excellent results. The theory underlying this



The above photo, through courtesy of the Alabama Agricultural Experiment Station, shows the effect of lime and boron on cabbage. Plant labeled No. 3, left

was grown in limed soil without boron being added. The one at the right, labeled No. 6, was grown in limed soil with borax added.

practice is that it is practically impossible to determine when and where only one or more of the trace elements are deficient in soils and therefore minimum requirement of all the trace elements should be provided in fertilizers.

Perhaps the most basic fact established about boron nutrition in plants is that a small continuous supply (an average of approximately one part in one million parts of soil) is required throughout the growing period of plants. It is surprising to many farmers as well as to fertilizer manufacturers that relatively small amounts of boron, 10 to 40 lbs. per acre of borax, give striking growth response. This small requirement suggests that the action of boron may be as a catalyst, but plant scientists have not as yet determined the exact function of boron although many abnormal developments are recorded where boron is deficient. Boron seems to be especially important in cell division and in the terminal growth and development of plants. A high-

ly interesting and practical observation is that boron is not translocated within the plant, which means that new growth cannot obtain its required boron from older growth. Accordingly, agriculturists see the need for a small but continuous supply of boron to be available for crops during their entire growth period.

Since the element boron does not occur free in nature, boron for fertilizers is commonly obtained from borax or borates which contain from 10.5 to 11.3 percent of the element boron. Compounds of boron occur primarily in bedded deposits and in brines of lakes. The principal minerals, tincal, rasorite, Colemanite, and ulexite, are either sodium or calcium borates or mixtures of the two. Ample supplies of borates are available in the United States from sources located largely in California. Commercial borax, $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$, refined from the deposits mentioned above, has been the primary source of boron for fertilizers. More recently "Fertilizer Borate," a semi-refined borate which contains 93% borax and is more economical, has been made available for fertilizer purposes. Through agricultural research investigations other borates are studied in order to determine the most practical and efficient borate material for different crops and soils.

Practice of adding 5 to 10 pounds of borax to each ton of fertilizer being adopted by some manufacturers. . . . Interest in trace elements on the increase . . . growth response great.

Factors involved in Sequestering 2,4-D

by

H. W. Zussman

Alroee Chemical Co.

Providence, R. I.

SINCE water is such an integral and necessary part of everyday environment, it is sometimes overlooked as a possible source of difficulty when it comes to the efficient utilization of materials for which it may act as a solvent or carrier. Water, in nature, is not generally found in the "pure" state, but may contain, among other things, varying quantities of dissolved inorganic solids—salts of calcium, magnesium, and to a lesser degree, iron, manganese and aluminum. Along the Eastern Seaboard and in the Northwest, inorganic solids content is generally low and the water is termed "soft." The Mid-continent, however, has a water supply containing objectionable quantities of alkali earth and metal ions (over 150 parts per million) and is termed "hard." Surface water (lakes, ponds, reservoirs) is usually soft, although its composition will vary with the season—being softer after the spring rains than during the summer and autumn when the percentage of dissolved solids is increased by evaporation. Ground supplies (wells and mineral springs) are usually harder but more constant in composition.

On the map of the United States, shown herewith, the shaded sections indicate areas in which hard water is generally found. It should be noted that large differences in water composition may occur even in small areas; in South Dakota, for example, hardness of water may vary from 20 to 2,000 ppm. The quality of a water supply is determined by the nature of the geological deposits with which it is in contact:

water which flows over or through limestone will obviously contain a high percentage of calcium.

The economic significance of hardness in water has long been recognized. In hard water areas the consumption of soap is higher than it is in soft water areas. The reason for this is that soap cannot be used efficiently in the presence of metal and alkali earth ions. The familiar "ring around the bath tub" is calcium and magnesium soap representing considerable waste.

But such economic waste due to hard water is not limited entirely to soap products. Among the recently introduced agricultural chemicals are several materials which, like soap, are carboxylic acid derivatives. These include many growth regulating substances such as 2,4-dichlorophenoxyacetic acid, naphthaleneacetic acid, indolebutyric acid, 2,4,5-trichlorophenoxyacetic acid and 2-methyl 4-chlorophenoxyacetic acid. Of these, the weed killer 2,4-D, is by far the most widely used and will, therefore, be discussed in some detail.

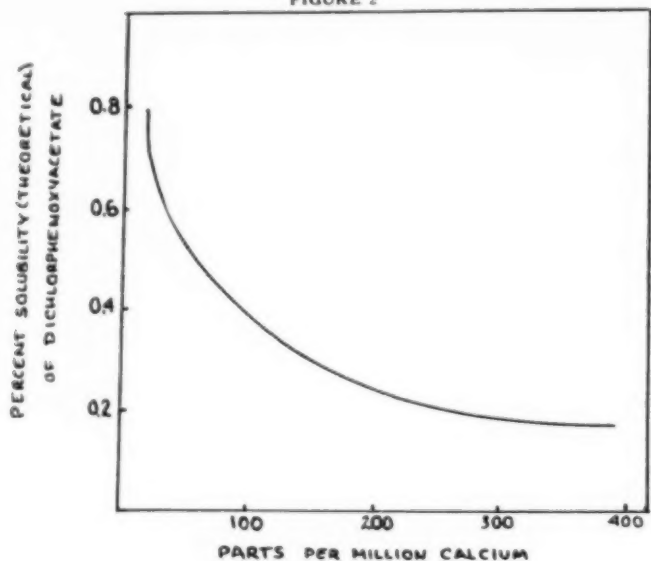
This compound is sparingly soluble in water. Its alkali and amine salts are relatively soluble. On the other hand, its calcium, magnesium and metal salts generally are sparingly soluble. The solubility of calcium dichlorophenoxyacetate is approximately 2.5 grams per liter:

of the magnesium salt 17.4 grams per liter at 20° C. While these solubilities are relatively high compared with corresponding calcium and magnesium soaps, they are, nevertheless, sufficiently low to interfere with the efficient use of 2,4-D in hard water areas. If a 40% concentrate of 2,4-D (as a triethanolamine salt) is diluted with water containing 400 ppm. calcium (1,000 ppm. calcium carbonate), in a ratio of one to three, one to 10 or one to 20, precipitation will occur in a matter of minutes. At dilutions of one to 100, the concentration of 2,4-D is reduced below the critical point and no precipitation occurs. The critical concentration of dichlorophenoxyacetate in water of varying degrees of hardness may be calculated from the solubility product equation.

$$[Ca^{++}] [dichlorophenoxyacetate]^2 = 67 \times 10^{-8}$$

In Figure 2 the critical concentration of dichlorophenoxyacetate is plotted against calcium concentration of the water. For example, in water containing 400 ppm. calcium, dichlorophenoxyacetate theoretically may be added up to 0.17% before precipitation occurs. If dichlorophenoxyacetate is added in excess, precipitation results. In practice this theoretical curve cannot be used because the amine with which the dichlorophenoxyacetate is neutralized exerts a solubilizing action on the calcium salt. Thus, in water containing 200 ppm. of calcium (corresponding to 500 ppm. calcium carbonate) the critical concentration of dichlorophenoxyacetate is not

FIGURE 2



.25% but 1.7%. In one particular case, 40 grams of dichlorophenoxyacetate (neutralized with triethanolamine) were dissolved in 1,000 cc water containing 400 ppm. calcium; precipitation of calcium dichlorophenoxyacetate began immediately and over five grams of calcium dichlorophenoxyacetate were recovered

by filtering. This represents a loss of 4.5 grams of dichlorophenoxyacetic acid or more than a 10% drop in efficiency of this weed killer. Just as important—in the field this precipitate will clog nozzles and interfere with spraying, which necessitates frequent stoppages and cleaning.

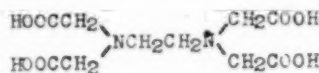


Crystals of calcium dichlorophenoxyacetate ($\text{Cl}_2\text{C}_6\text{H}_4\text{COO})_2\text{Ca}$ (magnified); when permitted to grow slowly, these crystals

will form clusters more than one-fourth of an inch in diameter. (Photo contributed by author of article.)

How can this waste be combated? The need for soft water is not as critical on the farm as it is in industry; this, coupled with the dispersion of farm population, makes the installation of water treating systems in farm areas a rather expensive solution to the problem. On the other hand, the common water softening chemicals used by the soap industry are not suitable.

The polyphosphates, otherwise admirable products, are, first of all, not soluble in the 2,4-D liquid concentrates which are more organic in nature than they are aqueous; and, secondly, the polyphosphates, unfortunately, are not stable on storage in solution reverting in time to the inactive orthophosphate. The problem confronting the formulator of 2,4-D concentrates bears many resemblances to that confronting the manufacturer of liquid soaps where the inclusion of a water softening agent in the package is necessary to prevent clouding on dilution of the soap with hard water. (*Soap & Sanitary Chemicals*, 24[2]:57). It would appear that what is required in either case is a water softening agent with good solubility in an organic medium and which will be stable on long storage. Such a product is the organic water softening agent, "Sequestrene AA"—ethylene diamine tetraacetic acid or ethylene bisimino diacetic acid.



This compound is a white crystalline powder (molecular wt. 292) insoluble in water and in the common organic solvents. It forms highly water soluble sodium, potassium, and amine salts.

When ethylenediamine tetraacetate (A) is added to a solution of alkali earth or metal ions, calcium, for instance, the following reaction occurs as seen at bottom of page 24. Sequestrene behaves like a water soluble ion exchanger. The calcium in the complex (B) is not available

A series of concentrates were prepared containing 40% 2,4-D dissolved as a triethanolamine salt and containing respectively 0%, 1% and 2% "Sequestrene AA" in the form of the tri-triethanolamine salt. The concentrates are all stable on storage and did not freeze at 0° C. These concentrates were diluted with varying amounts of water containing 1,000 ppm. calcium carbonate and allowed to stand for 48 hours. Significant precipitation or crystallization of calcium dichlorophenoxyacetate occurred, if at all, either immediately or within two hours. It may be noted that where water is not of the extreme hardness in-



Shaded areas in the United States map, above, represent areas where hard water

is found. Hard water presents complications in the formulation of 2,4-D herbicides.

dictated above, less sequestering agent is required to prevent precipitation. The advantage of using ethylenediamine tetraacetic acid in 2,4-D formulations may be illus-

tetraacetic acid to 40% 2,4-D concentrates is adequate for almost any situation encountered in actual practice, while 1% sequestering agent will be sufficient for all but

	Dilution—water: concentrate		
	3:1	10:1	20:1
40% 2,4-D containing no Sequestrene AA	precipitate	precipitate	precipitate
40% 2,4-D containing 1% Sequestrene AA	clear	precipitate	precipitate
40% 2,4-D containing 2% Sequestrene AA	clear	clear	clear

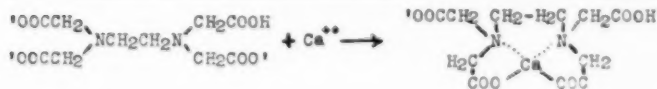
trated by a specific example. Taking the case mentioned above, the use of 40 pounds of 2,4-D acid at 4% concentration in water containing 400 ppm. calcium, resulted in the loss of 4.5 pounds dichlorophenoxyacetic acid by precipitation. The minimum amount of "Sequestrene AA" which would prevent precipitation in this case is 1.5 pounds. On a cost basis it may be calculated that the savings affected in this particular instance is approximately \$2.50—40 lbs. of 2,4-D used. The addition of 2% ethylenediamine

those cases of extreme hardness (over 600 ppm. calcium carbonate). A typical formulation of 2,4-D with ethylene diamine tetraacetic acid follows:

	lbs.
Dichlorophenoxyacetic acid	220
Triethanolamine	158
Ethylenediamine tetraacetic acid	6
Water	166
40% 2,4-D concentrate	550

Proper formulation would appear to be very important. It is probable that amines used for neutralizing the 2,4-D acid vary in their solubilizing effect on the calcium salt and, therefore, the proper amine should be selected carefully.

It is not known if dichloro-
(Turn to page 73)



Controlling Flies

WHEN reports of fly resistance to DDT residual sprays began to be heard early in the spring of 1948, a number of reasons for this were advanced. These included the possibility that current stocks of DDT were inferior to those of previous years; that dealers' stocks had deteriorated in storage; that 1948 had been an exceptionally favorable year for fly breeding; and that flies had actually developed a resistance to DDT. Subsequent investigations showed that whatever the

cause, DDT residual spraying was, in most cases, ineffective for fly control in the area of California where these experiments were made. A program was then launched by the Division of Entomology of the University of California Citrus Experiment Station, Riverside, to find the causes of such phenomena, and at the same time to find materials which would prove more effective.

Chemical and biological examinations were made of commercial DDT wettable powders, which had been used almost ex-

clusively for dairy spraying in the Southern California area, but no significant differences could be found between materials made in 1946, '47, or '48. These tests included samples which had reportedly proved inferior in performance. All samples from each of the three years registered exactly the same time for a 50 percent knockdown of houseflies confined on a treated surface.

Could the differences be in the strain of flies involved? To answer this question, samples of natural housefly populations were collected from various areas of California, including Bellflower, San Jose, Ontario and Riverside, and their reared progeny were compared by laboratory tests with a strain of houseflies which had been bred in captivity for several years, having never been exposed to DDT.

The residual tests which followed, using ten adult female houseflies in each test with four replications, demonstrated a marked resistance of the Bellflower strain of flies to DDT. It is apparently impossible to knock down and kill 100 percent of these flies with residual deposits of DDT. This strain is also somewhat resistant to methoxychlor, but is not appreciably resistant to gamma-benzene hexachloride or to chlordane compounds. The San Jose strain also shows def-

TABLE I.
Residual tests showing comparative 50 per cent and 100 per cent knockdown times.

Treatment	FLY STRAIN		
	Bellflower	San Jose	Laboratory
A. DDT 100 mg. per sq. ft.			
KD ¹			
50.....	720 mins. (12 hrs.)	420 mins.	91 mins.
KD ²			
100.....	2880 mins. (48 hrs.)	1440 mins. (24 hrs.)	152 mins.
B. Methoxychlor 100 mg. per sq. ft.			
KD			
50.....	255 mins.	56 mins.	37 mins.
KD			
100.....	360 mins.	108 mins.	67 mins.
C. Gamma-benzene hexachloride ³ 10 mg. per sq. ft.			
KD			
50.....	11 mins.	16 mins.	13 mins.
KD			
100.....	15 mins.	20 mins.	20 mins.
D. Heptachlorodicyclopentadiene ⁴ 10 mg. per sq. ft.			
KD			
50.....	40 mins.	48 mins.	44 mins.
KD			
100.....	52 mins.	60 mins.	51 mins.

¹ The time for 50 per cent knockdown.

² The time for 100 per cent knockdown.

³ The active constituent of technical benzene hexachloride.

⁴ The more toxic isomer of heptachlorodicyclopentadiene, also named 1,4,5,6,7,8,8-heptachloro-1,4,5,6,7,8,8-heptachlorodicyclopentadiene.

with BHC

inite resistance to DDT, slight resistance to methoxychlor and as the Bellflower strain, shows no appreciable resistance to gamma-benzene hexachloride or to chlordane compounds.

To obtain quantitative data on the magnitude of the resistance of the various fly strains to DDT, a comprehensive series of experiments was undertaken. Adult female houseflies, reared under controlled conditions and of uniform 2 to 4 day age, were treated with individual 1 cubic millimeter drops of the purified insecticides in acetone solution applied to the prothorax of the flies. Twenty flies were treated at each dosage, 8 to 10 dosages being used for each material, and each test series was replicated at least three times. From these values, dosage vs. mortality curves were plotted and the amount each insecticide per fly required to kill 50 percent of each fly strain was determined. The data in table II represent the results of the application of individual drops to more than 20,000 flies. These results show that the resistance of the Bellflower strain to DDT is 500 times, the San Jose strain 34 times, and the Ontario and Riverside strains 25 times that of the laboratory strain of flies. The Bellflower strain is about 200 times as resistant to DDT and 14 times as resistant to methoxychlor as is the laboratory strain.

Photo of fly through the courtesy of Museum of Natural History, New York.



The resistance to gamma-benzene hexachloride, toxaphene, chlordane compounds and pyrethrins was very slight or inappreciable.

The enormous differences in the susceptibility of the various fly strains as shown above, were not due to variations in the weight and vigor of the flies as is shown by the average comparative weights of individual flies, indicated below:

Bellflower strain 18.8 mg. per female fly
San Jose strain 19.4 mg. per female fly
Ontario strain 16.2 mg. per female fly

Riverside strain 19.8 mg. per female fly
Laboratory strain 21.2 mg. per female fly

Injections of DDT-acetone solutions directly into the bodies of the flies through the cervical region showed the same degree of resistance in all the fly strains as shown upon external application, thus demonstrating that the resistance is not caused by the failure of the DDT to penetrate the fly cuticle. To date, this enormous resistance of the Bellflower strain has been maintained over 15 generations bred in the laboratory completely free from contact with the DDT.

TABLE II.
Measured drop tests showing comparative 24 hour LD 50's¹
in micrograms per fly

Fly strain	DDT	DDD	Methoxychlor	Toxaphene ²	Gamma-benzene hexachloride	Heptachlorodicyclopentadiene	Pyrethrins
Bellflower	10	20	1	0.6	0.08	0.06	1
San Jose	0.7		0.3	0.4	0.05	0.07	2
Ontario	0.5		0.3	0.5	0.05	0.07	2
Riverside	0.5		0.3	0.5	0.06	0.07	2
Laboratory	0.02	0.1	0.07	0.2	0.01	0.03	1

¹ The amount of toxicant required to kill 50 per cent of the flies treated.

² Chlorinated camphene.

Field Studies

IN order to make rapid progress in providing adequate substitutes for DDT in fly control, field studies were begun in the summer of 1948 with a number of synthetic insecticides. Trials with DDT applied as a 50 per cent wettable powder at 40 pounds per 100 gallons of spray (approximately 2.5 per cent) showed that thorough spraying with this material in some cases eliminated the flies for a few days but generally provided no significant residual action. In some localities no effect on the fly population could be observed following the DDT applications. Such occurrences were correlated with the presence of highly resistant fly strains.

Barn spraying was carried out in the standard manner, using a high pressure spray rig and wetting the walls until the run-off point was reached. In all cases, applications were made when the animals were out of the barn and this investigation did not include the application of sprays directly to the animals.

Methoxychlor.—Trials with this material have in general proved much more satisfactory than those with DDT. When application was made at 40 pounds of the fifty per cent wettable powder per 100 gallons of spray (approximately 2.5 per cent), excellent fly control was obtained. The period of effectiveness varied from one week to one month. The situations where this material proved ineffective were directly correlated with flies definitely resistant to the chemical. Methoxychlor produces a more rapid knockdown than DDT and typically gives a more impressive performance. It is only about one-fortieth as toxic as DDT to warm-blooded animals and is thus considered safer to use. Its use in areas where flies are extremely resistant to DDT is likely to result in poor fly control.

Toxaphene.—This material was applied at 50 pounds of 40 per cent wettable powder per 100 gallons of spray (approximately 2.5 per cent). Its use resulted in good initial cleanup but reinfestation was rapid. Toxaphene produces a slow knockdown (about 3 times slower than DDT) and had only about one-tenth the toxicity of DDT to non-resistant flies.

Chlordane.—This material was applied as a 40 per cent wettable powder at 50 pounds per 100 gallons of spray (approximately 2.5 per cent). The initial cleanup was excellent and in some cases residual action lasted up to one month. In other cases, however, reinfestation was very severe after one to two weeks. The rate of fly knockdown by chlordane is slower than that of DDT.

Benzene Hexachloride.—Early tests with benzene hexachloride wettable powders showed so much promise that the material was given extensive trials during the summer and fall. This material produces a rapid fly knockdown, about five times as fast as DDT, and therefore gives more impressive results even on non-resistant flies.

Used as a wettable powder at a concentration of 0.25 per cent gamma isomer, the initial cleanup was nearly perfect and pronounced residual action was observed for three weeks to one month during the hottest summer weather and for up to two months during cooler fall weather. During these periods the treated premises remained almost free of flies. Benzene hexachloride wettable powders are generally available containing 6 per cent, 12 per cent, or 25 per cent gamma isomer. The 0.25 per cent dosage may therefore be obtained by using 34 pounds of the 6 per cent product, 17 pounds of the 12 per cent product, or 8 pounds of the 25 per cent product per 100 gal-

lons of spray. The 6 per cent gamma isomer product is produced from an unrefined benzene hexachloride and possesses a sharp and disagreeable odor and is irritating to the nose and eyes while spraying. It should be used with caution around dairies, homes, and other places where odor might be objectionable. The 12 per cent gamma isomer wettable powder is produced from a partially refined benzene hexachloride and has less odor and irritant properties. This product has been used in more than 150 dairies in Southern California with highly satisfactory fly control, and no complaints have been received as to odor.

Benzene hexachloride should not be used in milk rooms or around open milk containers because of the possibility of imparting disagreeable odor to the milk. Where an odorless and non-irritant treatment is desired, as in dwellings, the 25 per cent gamma isomer wettable powders made from purified gamma isomer may be used. These products are considerably more expensive than the 6 or 12 per cent gamma isomer wettable powders and do not appear to possess quite as long residual action.

Miscellaneous materials.—Experimental sprayings have been made with a combination of pyrethrins and piperonyl butoxide. This combination was highly effective against the flies on initial contact, but did not have adequate residual action at economical dosage levels. The new compound "H8" used at 0.25 per cent as a wettable powder has given promising results in limited tests, but the extent of its residual action has not been adequately tested.

Summary

LABORATORY and field studies have shown that the primary cause for failures of DDT residual sprays to accom-

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Above, Westchester Country Club, Rye, N. Y.

Annual Spring Meeting of National Agricultural Chemicals Ass'n

INFORMAL discussions of problems currently confronting the pesticide industry will be the main feature of the first meeting of the newly-formed National Agricultural Chemicals Association at the Westchester Biltmore Hotel, Rye, New York, May 5 and 6. The Association, formerly the AIFA, will confine its formal sessions to morning meetings, leaving the afternoons free for committee meetings and for recreation. Foremost in the latter category, of course, will be golf which is being arranged in an attractive program by the committee.

Present plans for the business sessions, call for talks by four speakers from organizations outside of the NAC Association. Their names will be announced when complete arrangements have been made and when all acceptances have been received.

George F. Leonard, Tobacco By-Products & Chemical Corp., Lexington, Ky., president of NAC, will open the meeting with a brief talk, following which Lea S. Hitchner, executive secretary of the Association, Washington, D. C., will present his semi-annual report to the group. Other names tentatively

scheduled for the opening day, include those of Federal Government officials, at least one of which will represent the U.S. Department of Agriculture, and another the Federal Food and Drug Administration.

In addition to the Federal representatives, Dr. C. E. T. Guterman, director of the New York State Agricultural Experiment Station, Cornell University, Ithaca, will speak as chairman of the Liaison Committee. This group comprises representatives of all phases of the agricultural chemical industry as well as allied interests. The committee interchanges views of industries and professions concerned with the development and use of pesticides on food crops and it also studies means of solving the problems involved.

The following is a list of the committee members, together with their affiliations:

Dr. B. E. Conley, American Medical Association; W. S. Everts, representing the canning industry; Samuel Fraser, the fruit growers; Dr. Stanley B. Freeborn, dean, University of California College of Agriculture, Berkeley; A. H. Harrison, frozen foods; Dr. A. B.

Heagy, American Association of Economic Poisons Control Officials; C. H. Mahoney, National Canners' Association; W. G. Reed, U. S. Department of Agriculture; Dr. S. A. Rohwer, U. S. Department of Agriculture; Ed. M. Searls, the dairy industry; K. H. Thatcher, National Association of Commissioners, Secretaries and Directors of Agriculture; Dave Thompson, Agricultural Consultant; Dr. Benjamin White, Food and Drug Administration; Dr. J. R. Wilson, American Medical Association; Herbert W. Voorhees, director of the American Farm Bureau Federation; and Fred S. Wyatt, representing the food processors.

A discussion of the broad aspects of Industry's problems, stressing the importance of a sound trade association as a means of solving such difficulties, will mark the opening of the second day's session. Following this, a forum on the operations of the expanded membership program of the NAC will be conducted under the chairmanship of Wallace Moreland, assistant to the president of Rutgers University, New Brunswick, N. J., and a mem-

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N. Central Branch, AAEE, Discusses

TOXIC RESIDUES

THE fourth annual conference of the North Central States branch of the American Association of Economic Entomologists was held at Milwaukee, Wis., March 24 and 25. Considered to be one of the highlights of the meeting was the U. S. Food and Drug Administration's announcement of its position toward the newer insecticides, particularly DDT and parathion.

Appearing as the first speaker at the Hotel Schroeder meeting, M. R. Stephens of the F.D.A. Chicago office told the entomologists that dairy products are to be banned from interstate commerce if found to be contaminated with DDT residues. No tolerance whatever will be allowed on DDT in milk or food products derived from it, he stated, but he set no date for applying this rule.

Regarding parathion, Mr. Stephens was less specific. If a proper spraying program is followed, there might be no residue problem, he said, but again, the eating of pears or apples treated with parathion might result in acute poisoning. Specifications for the chlorinated hydrocarbons, he added, are not yet available. However there will be no objection to use of BHC, he stated.

The purpose of the Food and Drug Administration, Mr. Stephens explained, is to protect the health of the American consumer. In specific situations where deleterious materials are required in the manufacture of a product, tolerances have been set up. Where use of toxic insecticides

is not essential, however, their residues are considered as harmful contaminants and a menace to public health.

He referred to the evidence that DDT accumulates in cow's milk and declared there is no justification for this, as viewed by his agency, since DDT is not necessary for milk production.

"This means," he told the gathering, bluntly, "that it will be impossible to use DDT as a spray on dairy cows or on the interiors of dairy barns, since such use will result in production of contaminated milk." Enforcement procedure, he said, will be similar to that followed against all contaminated foods.

Dr. E. F. Knipling, Bureau of Entomology and Plant Quarantine, U.S.D.A. stated that it has always been his bureau's policy to "go along with F & D rulings and make no conflicting recommendations." "From the standpoint of flies on cattle," said Dr. Knipling, "we have been anticipating this a couple of years. We believe methoxychlor is a good answer, but I am not convinced that it will do the job. We may find that flies will build up a resistance to this compound, too. We shall continue to stress sanitation and we can still get good fly control by treating other farm buildings as well as the dairy barn. We should continue to recommend DDT in regions where it gives good control, or chlordane or BHC in other resistant areas."

The Bureau, he added, will soon issue a definite statement

recommending that use of DDT on cattle be discontinued; that methoxychlor or pyrethrum be applied in its place on cattle, exactly as DDT has been used; and that methoxychlor be used on barn interiors. (Such a statement was later issued. See page 55).

Considerable feeling was indicated by various speakers because the abrupt announcement gave entomologists no time to prepare farmers for the switch from DDT to other products.

"People will lose confidence in us," said one extension entomologist. "Just because F & D says we should use methoxychlor I don't think we should be foolish enough to go ahead and recommend it. Maybe, though, F & D will be more definite next week, so we can get out some recommendations."

Another entomologist reviewed the intensive promotional buildup for DDT since its release in 1942 and asked "How can we convert the public in two or three weeks, especially since we have no recommendations that this other stuff will do the job?"

The F & D A, it was charged, has failed to consider all research done on toxicity of DDT. "This work cannot be wiped out over night," one speaker said, and another declared "We should ask them to show us their data. Then we should show them ours and ask them what is wrong with it."

The Bureau of Entomology is assuming that the F & D data is being interpreted correctly, Dr. Knipling interjected here. There

should be a way, he said, to study this data and have some one qualified interpret it. Reliable data, he continued, is available on contamination of milk by DDT but in barn spraying, he said, "We don't have much data and I don't believe anyone else has."

Reference was made to a similar situation created many years ago when the F & D A ruled against lead arsenate and western apple growers later showed where F & D was wrong, leading to a retraction of the ruling. This, it was hopefully implied, might happen again.

Industry Worried

INDUSTRY representatives present indicated deep concern over the ruling. Questions were raised about what to do with DDT stocks now in the field ready for use this season, all of which are properly labeled in line with "authoritative recommendations." Whether producers can supply offhand the immense quantities of methoxychlor immediately required was another question asked, but not answered. One industry man said manufacturers will go along with whatever is recommended, while another asked, "But where is the work on methoxychlor which we can use in presenting our product to the farmers?"

When the Resolutions Committee submitted a resolution expressing the attitudes voiced at the previous evening's session, the resolution was voted down unanimously. The group considered it "unwise."

Equally unanimous endorsement was, however, given a kindred resolution which referred to the "great confusion as to the safe use of the newer insecticides and the fate of residues on plants, animals and inanimate surfaces, and great uncertainty as to interpretation of analytical tests. Continuing, this resolution urged that there be "close correlation between the

Bureau of Entomology and Plant Quarantine, the States and other agencies possessing data, and the Food and Drug Administration, so that results of research can be applied in making rulings, thus decreasing confusion, reducing hardships among producers and processors to a minimum and preventing hasty and unwarranted rulings."

Dr. List Heads Branch

DR. GEORGE M. LIST, professor of entomology and extension entomologist at Colorado Experiment Station, Fort Collins, Colo., was elected president of the North Central Branch of the AAEE, and Dr. Ray H. Hutson, professor of entomology and extension entomologist at Michigan State College, East Lansing, Mich., was chosen vice president. Dr. J. W. Apple was re-elected secretary-treasurer. Formerly associated with the Illinois Natural History Survey, Urbana, Ill., Dr. Apple moved on April 1 to Madison, Wis., to assume new duties at the Wisconsin College of Agriculture.

A resolution of interest to manufacturers of agricultural chemicals was approved which points out that "recommendations for field crop insect control are given in pounds of actual or active insecticide per acre and most insecticide labels are not specific as to content," and urged formulators and processors "to place on the label the pounds of active ingredients in the package."

Another resolution approved by the group, expressed condemnation of the "distorted, ill-advised, incorrect articles in newspapers, popular and scientific magazines and journals" and the "unjust and indiscriminate blame given the newer chlorinated hydrocarbons as the cause of livestock and wild life losses." Members of the Association were urged to "counteract these articles with publicity which is correct and, when distorted claims are proven false, to give equal

publicity to the true cause of the difficulty."

One other resolution referred to the Hoover report on the USDA and called attention to the possible effects of decentralization on the many phases of research, control and quarantine activities, to the injury of entomology and agriculture generally. Earlier action on the matter by the parent AAEE was endorsed, and a copy of this resolution ordered sent to the Secretary of Agriculture.

Some 115 topics were programmed for discussion at the two-day conference in Milwaukee. These were presented in two general sessions and in seven group meetings covering field crop insects, forest entomology, insects affecting man and domestic animals, extension entomology, apiculture, truck crop insects and fruit insects.

Among outstanding program features were two reports by Dr. E. W. Laake, BEPD, Kerrville, Texas, one on "Chlorinated Hydrocarbons and their Toxicity to Domestic Animals," the other on "Control of Insects Affecting Animals."

In his tests of chlorinated hydrocarbons on cattle, hogs, horses, sheep and goats, Dr. Laake stated, there were no deaths from acute toxicity and no injuries except with chlordane. With toxaphene, young animals were more susceptible to toxic effects. If material is imbibed during dipping, he felt that it could not be sufficient to kill, since direct injection and oral ingestion had no apparent ill effect. Chlordane in wettable powder form and at various concentrations killed all animals tested, except where the formulation was below 1 percent, when it had no ill effects. BHC proved fatal to adult animals, except at 0.025 percent, where none was affected, and excellent control was obtained of ticks and flies without toxic effects.

Toxaphene killed or affected

ed all animals tested at concentrations above 1 percent. Below that level it had no ill effects. In six sprayings and five analyses of the meat, some increase was noted in amounts accumulated in the body, then it went down, and Dr. Laake stated that in his opinion, toxaphene is thrown off rapidly.

In his second paper on "Control of Insects Affecting Animals," Dr. Laake asserted that available commercial dusts are not as fine as desirable. From 90 to 95 percent, he suggested, should pass a 200-mesh sieve. He told of work at Kerrville on a rotary brush for applying sprays at low pressure against cattle grubs and of screening 950 materials in the hope of finding one that can be injected in the cattle to kill the grubs. "Eventually we may stumble on to one," he said, "which will give good control of grubs and other blood sucking pests."

Regarding DDT, Dr. Laake remarked that although now restricted in use, several other materials appear to be equally effective.

Nothing highly effective has been found to control horseflies, he said. New materials tested did not last and effects varied with the species. A new remedy against screw worms may be found soon as a result of efforts now in progress to find a smear which does not stain the animal.

For fleece worm fly DDT and BHC were good, he said, while chlordane and toxaphene gave protection for 8 to 10 weeks and he was unable to re-infect the animals. All chlorinated compounds were effective in low concentrations against lice. All new materials were tested extensively against ticks and three were outstanding: chlordane, toxaphene and a DDT-BHC combination. This latter, Dr. Laake said, was the best remedy, since it killed both engorged and unengorged insects.

Dr. E. F. Knipling of the BEPC, in a review of fly resistance to DDT, declared "There

is no question but that the resistance problem, so far as the housefly is concerned, is serious. This is not universal but in some areas it is acute."

The Bureau, he said, has now developed colonies of flies up to the 65th generation which are almost impossible to kill with DDT. Other materials have been tested and very little resistance was found to gamma BHC. Methoxychlor resistance, however, carries over and the degree of control with this material, he said, may depend on the fly's resistance to DDT. Some excellent results were obtained with chlordane.

Referring to the "toxicity complication," he said that for use in barns, chlordane, methoxychlor and BHC might be suggested as alternates to DDT, in areas where fly resistance varies. But, because of the F & D stand, only methoxychlor or pyrethrum could now be recommended, coupled with extreme sanitation measures.

C. F. Gerlach of Michigan Chemical Co., Saint Louis, Mich., directed attention to colloidal DDT for insect control, this being described as a new type of insecticide formulation applicable to DDT and other insecticides and fungicides as well. Colloidal DDT, he said, has lower residual effectiveness and would be safe to use as crops near harvest. Its lack of oil odor or objectionable residue makes it desirable as well as effective against household insects, flies and mosquitoes, he asserted.

Dr. Paul A. Dahm, Kansas State College, Manhattan, Kans., reported on tests with "Compound 118," a new insecticide recently introduced by Julius Hyman & Co., Denver, Colo. Discussing "The Relative Effectiveness of Organic Phosphate Insecticides," Marshall Magner, of Monsanto Chemical Co., St. Louis, Mo., pointed out the high toxicity of parathion to insects but said that because of its extreme toxicity to warm blooded

animals, the fate of this as well as other materials in this class remains for the future to determine. Don't use parathion on food crops less than 30 days before harvest, he warned. He also discussed use of TEPP in greenhouses.

Another industry representative on the program was A. C. Miller of Gulf Oil Corp., Pittsburgh, Pa., who discussed New Hampshire tests of insecticide resistant houseflies, a subject which he said had been published in *Soap and Sanitary Chemicals*.

Still another industry representative was Fred Fletcher of Dow Chemical Co., Midland, Mich., who covered the subject of soil insecticides. While costs of some of the newer fumigants may be high, he said, their chief advantage is that they control certain soil pests not affected by the older fumigants.

Discussing emulsions, Dr. F. C. Allen, Madison, Wis., pointed out that they used to be tailored to the job in the field, whereas today's emulsions are proprietary products that must fit many uses. If concentrated sprays are to be used, he asked, why cannot emulsions be prepared for specific crops. Industry can help, he said, and an attempt should be made to formulate emulsions for particular concentrated sprays.

Parathion used in greenhouses is probably not the primary cause of leaf drop, Dr. L. L. English, Illinois Natural History Survey, Urbana, Ill., asserted. He also reported on a tendency of the two-spotted mite to build up resistance to parathion. "I suspect this is taking place in two or three Illinois greenhouses," he said. "Nothing has been published on this development and we would do well to think about it." Workmen, he said, are becoming careless in their use of parathion, especially as aerosols, and entomologists should not be remiss in warning

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Technical Briefs

Spray Schedules Examined

In an experiment to determine the influence of timing of spray applications on control, schedules were begun at 10-day intervals from June 10 to August 19 and ended 60 days later. It was found that beginning on July 10 or 20 was most effective. Fungicide comparisons (30 or more materials) again indicated that zinc dimethyl dithiocarbamate ("Zerlate") still ranks at or near the top for anthracnose control. A test of eradicant sprays applied to the soil just before the plants fell over indicated that at least two of the materials tested may be expected to give some control of later fruit infection. The addition of various stickers, etc., to "Zerlate" showed little increase in control over the 2-100 formulation. A further comparison of numerous varieties, hybrids, etc., still failed to uncover any marked resistance to the disease, but considerable tolerance was exhibited by some lines. Another experiment, in which the tomato fruits were observed at 2- and 4-day intervals after picking, indicated considerable variation in breakdown after picking. Further tests with trellises indicated that keeping the fruits off the soil is more effective than any spray program in preventing infection.

—*Tomato Anthracnose Control in 1948.* J. D. Wilson and H. A. Rannels.

Apply Nitrogen from Air

Distributing fertilizer from the air is reported as successful following recent experiments in southwestern Indiana. First tests, under the direction of Extension Agronomist H. R. Lathrope, Purdue University, consisted of the unloading of 1,000 pounds of nitrogen pellets consisting of 20.5 percent nitrogen, and 79.5 percent cal-

cium and magnesium limestone, on ten acres of wheat.

The fertilizer was distributed while the fields were wet and soggy, and the pellets were dissolved almost immediately on the surface of the moist soil. The ten acres were treated "in a matter of minutes" the report states.

Within 48 hours, a dark green lush growth shows up where the nitrogen is applied, when the weather is conducive to growth, subsequent experiments have shown. Early application of nitrogen material brought an increased yield of 12 bushels March first and 5 bushels April first.

As a result of these experiments, more than a thousand tons of this material have been purchased by wheat producers in the "Pocket Area" of Indiana. About ten percent of the area's 200,000 acres are due to be treated from the air. Numerous airplane crop dusters have been engaged to do the work, which is considered advantageous since heavy rains make it difficult for producers to get into fields with grain drills to apply nitrogen materials when they will do the most good.

DDT for Wireworm Control

Laboratory tests on the toxicity of DDT to the Pacific Coast wireworm (*Limonius canus* Lec.) and the sugar-beet wireworm (*L. californicus* Mann.) have been underway at Walla Walla, Wash., since 1943. Field experiments on the control of these wireworms have been conducted by the Walla Walla, Wash., and the Ventura, Calif., laboratories since 1944. *L. canus* and *L. californicus* are the most common species of wireworms that attack crops in western irrigated lands and have high moisture requirements. The action of DDT on them is slow. After contact

with chemicals the affected wireworms live for weeks and appear to be desiccated slowly. Wireworms are not repelled by the chemical. Low concentrations of DDT in the soil are very toxic, and because of the apparent cumulative effect of the DDT, wireworms die after repeatedly coming in contact with the material in the soil.

Dosages of 10 to 20 pounds of DDT per acre remain toxic to wireworms the second season after application. DDT has no effect on eggs or pupae. Its action on adults is slow, as after exposure mating and egg laying take place before the adults die. The most sensitive stage of these insects is the first few weeks of their existence as young wireworms.

Many field tests under a variety of soil conditions have shown that a dosage of 10 pounds of technical DDT per acre, either dusted or sprayed on the surface in the spring and thoroughly mixed with the soil to a depth of 6 to 9 inches, greatly reduces wireworm numbers. Even though this treatment has not protected crops planted immediately after treatment, it has reduced the damage to late tuber and root crops for three seasons. No appreciable number of the new brood of wireworms survived for three seasons. Over a 4-year period the 10-pound dosage has not been detrimental to plants and soils when the DDT was thoroughly mixed with fine sandy loam, sandy loam, silt loam, or loam soils.

In sandy loam to very fine loam in Ventura County, Calif., the yield of dry lima beans was substantially increased when 10 to 20 pounds of DDT was applied per acre 3 to 6 weeks before planting. The insecticide was applied as a 10-percent dust and was disked well into the soil to a depth of 6 to 8 inches. As in Washington, reductions in wireworm populations were slow but persisted for the third season.

Memorandum

"Velsicol 1068" Chlorclane Effectively Controls Soil Infesting Insects

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3. WHITE GRUBS
4. MOLE CRICKETS
5. WHITE FRINGE BEETLE LARVAE

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Excessive dosages of DDT in the soil have injured plants. In view of the stability of DDT in the soil, crop injury may result from accumulations of DDT when repeated applications of the insecticide are made over a period of years to the soil and to crop foliage.

Parathion Tested on Stock

The summary of preliminary tests of the toxicity of parathion to livestock, as reported by Kelvin Dorward, Entomologist, North Florida Experiment Station, Gainesville, indicates that livestock are not immediately affected when sprayed with or consumer feed treated with normal applications of parathion. "At no time were the animals off feed and for the type of animals involved, the gains are considered normal. Only by long range intensive studies will it be possible to determine the ultimate harmful effects, if any, to livestock from parathion when used in crop protective work." The author emphasizes that this work should in no way be considered conclusive.

—*The Florida Entomologist*, Vol. XXXI, No. 4, December, 1948.

Check Residues on Food

Food processors are watching with interest the development of new insecticides that will help avoid the residue problem on fruits and vegetables. They are also interested in sprays and dusts for insect pests and diseases that will not affect the quality of the raw product, especially the flavor.

In some cases it has been found possible to so adjust a spray or dust program that most of the insecticide residue will weather away before the crop is harvested. With other materials this objective is almost impossible to attain.

The Station investigations involve new techniques for measuring minute quantities of residue of the newer types of insecticides. For ex-

ample, with the introduction of parathion, a photoelectric colorimeter has been brought into use that will detect the presence of as little as one-hundredth part per million of the insecticide on the surface of fruits or vegetables.

In earlier studies of the residue problem involving chiefly lead and arsenical residues, washing the fruit before processing in a weak acid solution aided greatly in reducing the risk. The newer insecticides, however, are mostly organic in nature and no ordinary washing procedure has yet been found effective in removing the residues. Insecticide manufacturers, growers, processors, and Station workers are pooling their efforts to assure high quality raw products for conversion into healthful processed foods.

—*N. Y. State Agricultural Exp. Sta. Bulletin No. 7156*.

Development of Fungicides

Fungicides tested in the field on McIntosh apples for scab control may be rated as follows: (1) "Bioquin 1" with "Orthex," (2) "Phygon" with "Good-Rite p.e.p.s.," (3) "Bioquin 1," (4) "Phygon," (5) "Puratized Agricultural Spray" and "H1, 331" (phenyl mercury acetate), (6) "341C" (2 hepta-decyl glyoxalidine), (7) "Fermate," and (8) wettable sulfurs. "Bioquin 1," "Phygon," "Puratized," and H1, 331 "are both protective and eradicated at the time infection takes place, whereas "341C," "Fermate," and the wettable sulfurs are protective only. "Puratized" gave an erratic performance, "H1, 331" was more effective and stable than "Puratized," but injury may be a factor. "Phygon" gave good scab control early in the season, but secondary scab developed at harvest. It was toxic to the trees and the operator. "Fermate" gave better scab control on the fruit than on the foliage. It broke down late in the season, allowing scab to build up on the underside of the leaves.

Preliminary tests indicate that "Phygon" and "341C" will be improved as to effectiveness and made less injurious. The data indicate the possibility of combining the eradicated materials with "Fermate" or sulfur so as to have a material approaching the effectiveness of liquid lime-sulfur without causing injury. The need for a fungicide that is both eradicated and protective without an injury factor is urgent. The revamped spray schedules, due to the advent of new insecticides, opens up the field of compatibility. Wettable sulfurs are still recommended as the basic fungicide for apples. "Fermate" is suggested for the cover sprays or after bloom. The places of the other materials in the spray schedule remain to be determined.—J. M. Hamilton, in *Sixty-seventh Annual Report of New York State Agricultural Station, Geneva*.

Nematodes in Conn.

Reports of the presence of the *Pratylenchus* species of nematodes on the roots of peach trees in Hartford County, Connecticut, have been received by Frank D. Johanson, Extension Fruit Specialist, University of Conn., Storrs, Conn., who had submitted specimens of peach roots to the U.S.D.A. Division of Nematology.

The pest is described as one which enters the cortical tissue rather than forming galls on roots. The nematode migrates through the cortical tissue and deposits eggs there which cause decay of the roots and often the sloughing off of the cortical tissue. A survey is being conducted to determine the extent of the infestation. Early indications are that the pest appears to be most serious in orchards which have been planted continuously to peaches for the past thirty years.

The Division of Nematology reports that *Pratylenchus* sp. has been found to cause a slow decline in apple, almond, fig, walnut and cherry trees in other parts of the United States.

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**Ample Stocks, Lower Prices in
Prospect as 1949 Season Begins for**

PESTICIDE TRADE

by

Melvin Goldberg

Pesticide Advisory Service
37 Wall Street, New York



CHEMICALS used in the manufacture of agricultural pesticides have shown a decided increase in movement during the past several weeks. This is to be expected in view of the approach of the agricultural season, in addition to the fact that inventories in general throughout the industry during the past season have been extremely low.

Buyers for the most part are still wary in consideration of further possible declines but the market for both pyrethrum and rotenone have firmed up considerably with the announcement by many of the leading producers in this field of a price rise.

Early in March, one of the leading factors in the rotenone market announced an increase in the price of rotenone to 30¢ lb. for 5% material, this price being f.o.b. plant. About 2 weeks later, another leading factor announced an increase in price to 32½¢ lb., and it now appears quite possible that by the middle of April the price will be quoted at 35¢ lb. In addition to the trend away from synthetic organics over to the botanicals in view of the toxicity problem, there is a rather severe shortage of new rotenone roots in the stocks of U.S. processors. This position, as has previously been pointed out in these series of articles, was due to the uncertainty last fall and

early winter when rotenone roots should have been moving from the Near East and South American points. As a result of the price uncertainty here in the U.S. at the time, plantation growers were reluctant to face the loss which they would have encountered at that time. The shortage which exists at the moment is a result of this reluctance to ship.

A leading producer has recently introduced a combination of pyrethrum and rotenone combined with a synergist which should represent an economical source of these two materials for insect control. The material is a combination of cyclomene, pyrethrum and rotenone and when diluted in accordance with instructions, gives a finished dust of 0.25% rotenone, 0.5% cyclomene and .02% pyrethrins. This material should find wide use in truck crop work and should have a definite advantage of non-toxic residue.

During the past cattle grub season, there was a very active movement of rotenone into this use. However, the very bad snowstorms and cold weather in the mid-far west affected the cattle grub control program considerably. Many industry spokesmen felt that this would have been a banner season for the use of rotenone in this field had not inclement weather interfered.

Pyrethrum

IN THE middle of March two important pyrethrum processors indicated an increase in the price of 20% purified pyrethrin extract. One of the producers set a price of \$9 lb. in large quantities while the other producer indicated a price of \$8.50 lb. No doubt other producers will follow along these channels.

Prices of the 20-1 concentrates were also affected by most producers who announced their prices as \$7 per Gal. As this column has indicated in the past few months, the situation with respect to pyrethrum is gradually tightening up and industry spokesmen feel that the limit has not yet been reached. It is expected that with the continuing uncertainty of supplies from abroad plus the trend toward use of the botanicals here in the U.S., that both pyrethrum and rotenone will find a very marked increase in use during the coming agricultural year. Pyrethrum is also increasing in demand for the low pressure aerosol bomb units which will be out in tremendous quantity during the coming spring and early summer season.

Methoxychlor

METHOXYCHLOR which has been indicated as of possible interest as a substitute or a supplement (Turn to page 75)

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Toxicity, Labels and Proper Use of

Agricultural Chemicals

THE Division of Agriculture and Food Chemistry of the American Chemical Society met March 27 to April 1 at the Fairmount Hotel, San Francisco, California. Prominent on the agenda were papers discussing toxic residues of various insecticides, a symposium on economic poisons, labeling, and newly-developed toxicants. S. A. Hall, U. S. Department of Agriculture, Beltsville, Md. reported on two new preparations which showed early promise: diethyl p-nitrophenyl phosphate and tetraethyl dithiopyrophosphate, and described another compound (octamethyl-pyrophosphoramide) which may be added to the soil to be absorbed by the plant, making the plant insecticidal. These compounds were synthesized by the German scientist Schrader, Dr. Hall said. The latter material is for application only on plants not used for consumption by either humans or animals.

R. H. Robinson, Oregon Agricultural Experiment Station, Corvallis, in discussing spray residues on food crops and their relation to food consumption, stated that with many insecticides, only relatively small amounts suffice for effective control. DDT, properly applied to several vegetable and fruit crops need not exceed 2 to 3 ppm at harvest, he said. Parathion need not exceed 0.5 ppm at harvest, and on most food crops is less than 0.1 ppm at harvest. It would seem that such small amounts of insecticides on food crops could not possibly be considered a health hazard, he declared.

It was pointed out further that the amount of food crops treated with any particular insecticide would be less than 10 per cent by weight of the total food consumed

by the average individual, leaving but a small chance for any insecticide, properly used, to leave residues in amounts sufficient to constitute a health hazard.

Before the symposium on economic poisons, with Dr. J. L. St. John, Washington Agricultural Experiment Station, Pullman, Wash., presiding, Stephen S. Easter, Food and Agriculture Organization of the United Nations presented a picture of world use of economic poisons, emphasizing the importance of preventing destruction of stored food by insects.

Dr. S. A. Rohwer, Assistant Chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., Washington, D. C., cited the heavy losses caused by insects each year in the U. S., pointing out that insecticides are "important and essential" to reduce such losses. Most insecticides are poisonous to warm-blooded animals, he reminded, and this brings about problems such as safe dosages, protection to persons using the materials, residues which remain on edible parts of plants, and possible injurious effects from accumulations in soil.

Dr. W. G. Reed, Chief, Insecticide Division, Livestock Branch, U.S.D.A., Washington, discussed labeling requirements for economic poisons under Federal Law. He stated that the most significant change between the law of 1910 and the newer Act of 1947, is the requirement for registration with the U.S.D.A. of all insecticides and other economic poisons before marketing them in interstate commerce.

Herman Wachs, Dodge & Olcott, Inc. and Howard A. Jones and Lawrence W. Bass, U. S. Industrial Chemicals, Inc., New York, described insecticides which can be

used in protecting stored grains without danger of toxic residues. Piperonyl butoxide in combination with pyrethrins was given as an example.

Arnold J. Lehman, Division of Pharmacology, FDA in his discussion of "Pharmacological Considerations of Insecticides" gave the following rating of common new insecticides on a basis of toxicity hazards, the sequence from the most to the least hazardous being given as follows: tetraethyl pyrophosphate, parathion, Compound 497, nicotine, Compound 118, chlordane, toxaphene, DDT, rotenone, beta isomer of BHC, gamma isomer of BHC, Lethane 384, Lethane 384 Special, technical BHC, alpha isomer of BHC, Lethane 60, Thanite, delta isomer of BHC, TDE, Octacide 264, methoxychlor, pyrethrum, N-propyl isomer, piperonyl butoxide.

Discussing the removal of residues of DDT and parathion from apples, pears and oranges, F. A. Gunther of the California Citrus Experiment Station, Riverside, reported that with apples and pears use of sodium silicate has proved consistently superior, removing 90 per cent of the residual surface DDT in many cases, while an alkaline soap gave good results on oranges.

The new insect toxicants, Compounds 118 and 497, were discussed in a paper by a group of research workers connected with Julius Hyman & Co. Compound 118, at effective dose levels, is residually active for a period of two or three weeks, and shortly after this time has evaporated completely. It thus holds promise for use on food crops, as well as being a soil and space fumigant.

THE PENDULUM SWINGS



Reviewing the 1949 recommendations for the use of agricultural insecticides brings forcefully to those interested the growing attention being given to the cumulative residual effects of the newer chemicals on growing crops.

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The Listening Post

New Oak Tree Disease Discovered

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller



A NEW disease of oak trees has been observed in Wilmington, Delaware by R. M. Viggers of the Bartlett Tree Expert Company and A. C. Tarjan, Research Fellow of the same firm at the University of Maryland. The disease has affected pin oak trees particularly. Symptoms were first noticeable as early as 1943, and have increased in severity so that about 50 to 60 percent of the pin oak trees in the city now show the disease. Although red oaks are also affected, the disease is not so severe.

First signs of the trouble are extreme sensitivity to drought, and yellowing of the foliage of affected branches, followed by dying of the leaves from the margins toward the inside. After the leaves have died they may fall off prematurely, resulting in a tree with one or more live but barren limbs, or they may persist on the affected limbs, standing out in marked contrast to the healthy foliage. Affected trees may be recognized in autumn by the tan to brown, dried appearance of the leaves in contrast to the reddish-brown lively color of the foliage on healthy trees. Symptoms may show first on individual limbs and spread slowly throughout the tree over a period of several years, or may appear generally on the whole tree in one growing season. Appearance of some trees killed by this trouble is very similar to injury caused by some type of illuminating gas.

Pronounced growth fissures occur on the trunk, and formation of callous tissue over wounds takes place almost twice as rapidly as on normal trees. The formation of water sprouts on the trunk in advanced stages, as well as a fluted condition of the crown, suggest that the crown tissue is stimulated to excessive growth because of inability of the roots to utilize food.

Widespread killing of root hairs and fibrous roots is another striking symptom. Rootlets of trees showing foliage symptoms are found, for the most part, to be quite dead and easily pulled apart. After several fruitless inspections of roots from trees in various stages of decline, roots were examined from a tree that had almost died from this trouble, but had been restored considerably by the addition of large amounts of organic material and fertilizer to the soil. Two root pathogenic nematodes found in considerable numbers were the migratory parasite *Hoplolaimus coronatus*, and root-inhabiting meadow nematodes of the genus *Pratylenchus*. Subsequent observations of the root systems of 20 affected seedlings yielded *H. coronatus* in 18 cases, the others failing to harbor the organism apparently because of a conspicuous absence of fine feeding roots. It appears that in the case of the recovered oak, the soil treatment stimulated the production of new roots which, in turn, were at-

tacked by and supported the feeding of nematodes.

It is possible that *H. coronatus* may be the cause of the trouble or that it may be closely related to its severity. This is not the first report of this nematode on pin oak, since R. L. Pierpont of the Bartlett Tree Expert Company sent roots from affected Wilmington trees to the U. S. Division of Nematology in 1947.

It is not concluded that the frequent occurrence of nematodes in oaks showing these symptoms is proof that the condition is due to the nematodes. However, continual efforts to explain the oak trouble by relating it to known parasites, physiological disturbances, toxicants, or food deficiencies have been unsuccessful.

The writers report that the meadow nematode, *Pratylenchus*, had not previously been found associated with pin oak. They found only one plant bearing these organisms in considerable numbers. Shortly afterwards, Mrs. C. Lewis of the U. S. Division of Nematology found meadow nematodes in oak roots. These findings suggest the possibility that this nematode may also be a factor in the decline of oaks.

The trouble described has been found definitely only in Wilmington, Delaware, on pin oaks and red oaks, but symptoms have been noticed in Washington, D. C., and in the States of Maryland, Pennsylvania, and New Jersey.

Alfalfa Nematode Found

IN April 1948 J. L. Weiner and O. E. Sell of the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering, Division of Forage Crops and Diseases, visited an alfalfa field near Macon, Georgia, to investigate the cause of the rapid depletion of the stand. It was soon evident that the plants were being killed by the stem nematode, *Ditylenchus dipsaci*. Dr. G. Steiner, of the U. S. Division of Nematology, confirmed the identification, and re-

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ported that this was apparently the first report of the presence of this nematode in Georgia. Dr. Steiner also said that although he believes the organism to be widely distributed, most of the records of its occurrence are from Western States.

In the field inspected, the disease was fairly generally distributed although damage was more serious in lower parts than in higher. The stand was beginning its second year and already some areas were badly depleted. The land had grown alfalfa for five consecutive years before the planting of the present stand. It is not known how long the stem nematodes had been in this field or how they became established there. The seed used in the 1946 planting apparently was not the source of the nematode infestation

because a second field was planted with some of the same lot of the seed at the same time and no nematodes were found in it.

Another Eastern State in which this nematode was found in 1948 is Virginia. S. B. Fenne and other workers, of the Virginia Extension Service and Agricultural Experiment Station and the U. S. Bureau of Plant Industry, Soils, and Agricultural Engineering, report its finding in an alfalfa field in Henrico County.

New Nematode for the U. S.

B. G. CHITWOOD, of the U. S. Bureau of Plant Industry, Soils and Agricultural Engineering, Division of Nematology, reports that soil samples from several places in North Dakota, submitted during

(Turn to page 75)

cide applications were required. Aphid infestations on cabbage and related crops were generally moderate in the southern states from which reports were received during late February and early March. Aphids were serious in some cabbage fields in California during the last half of February. Toward the middle of March the cabbage aphid was very destructive in many cabbage fields in the lower Rio Grande Valley of Texas.

The yellow-margined leaf beetle was reported to be causing complete destruction of some turnip patches in Spring Hill (Mobile County), Alabama, during the latter part of February.

The vegetable weevil continued to attack turnips in South Carolina, Georgia, and Florida during the last half of February and early March, and was also reported causing some injury in tobacco plant beds in northern Florida and southern Georgia.

Infestations of the spinach aphid, which were abundant on spinach in eastern Virginia during late February, appeared to be decreasing early in March. Light to moderate infestations of the pea aphid were reported on garden peas in South Carolina during this period. Occasional heavy infestations also occurred on garden peas in northwestern sections of Florida.

Around the first of March, aphids were reported as abundant in Georgia, South Carolina and Florida on potato, celery, pepper and lettuce. They were on the increase at that time on spring lettuce in the Salt River Valley of Arizona, with insecticide applications being required in some fields. Toward the middle of March, aphids were abundant on young okra plants in the lower Rio Grande Valley of Texas. Scattered infestations of aphids were also found at that time on tobacco plant beds in northern sections of Florida. In some places, control operations were underway to prevent carrying the insects into the fields.

Status of Insect Pests in the South



This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Haussler is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. & P. Q., U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.

By G. J. Haussler

MEXICAN bean beetles were observed for the first time this year around the first of March in Decatur County, in southwestern Georgia. The beetles were said to have made their appearance in that area about 3 weeks earlier than normal. During the second week of March, a few adults were attacking early spring snap beans in northwestern sections of Florida. The bean leaf roller was moderately abundant on beans in parts of southern Florida during the last half of February. Leafhoppers appeared to be on the increase on beans in that area during early March, and aphids and pod borers were beginning to be noted in some sections.

The serpentine leaf miner was moderately abundant on beans

in Dade County of southern Florida during the last half of February and increased somewhat in abundance as a pest of that crop in the area during the first half of March. This pest was also reported attacking beans in other sections of southern Florida, and was also numerous on cucumbers. It was also present on tomato, potato and celery in southern Florida.

Cabbage caterpillars were generally light to moderate on cole crops during the last half of February and first half of March in Virginia, South Carolina, Georgia, Florida and Louisiana. Populations of these pests were greater than usual in the Charleston area of South Carolina late in February and continued to increase early in March to the point where insecti-

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S. Dakota Weed Conference Held

A TWO-DAY State Weed and Livestock Pest Control Conference was held at Aberdeen, South Dakota, March 15 and 16, with an estimated attendance of between 2,000 and 2,500. Fifty-six exhibitors of chemicals and application equipment were represented.

E. G. Sanderson, State Weed Board, Aurora, S. D., R. C. Kinch, seed analyst of the South Dakota State College and C. J. Gilbert, State Weed supervisor, Brookings, S. D., spoke during the first morning reiterating that organization and education are main factors in promoting community action for weed control. Special emphasis was placed upon bringing the problems into the light and having full discussions of control methods.

Tuesday afternoon's meeting, with Dr. W. W. Worzella

residing, included a talk by Lyle Derscheid, agronomist in charge of weed research at S. D. State College. Mr. Derscheid stated that 2,4-D should be used as a supplement to good farming methods, rather than as a substitute. He reminded that 2,4-D may cause abnormalities in corn roots but indications are that it causes no decrease in yield. Plants may also become more brittle, and 2,4-D may cause a curvature of stalks, making it harder to harvest with mechanical pickers.

Although 2,4-D is not considered to be toxic to animals or human beings, he stated that the material should be used carefully. He warned that even fumes from an idle sprayer, just used, can damage nearby trees; and of course susceptible crops must be avoided completely.

L. M. Stahler, U.S.D.A. agronomist in charge of midwest weed research, Brookings, pointed out that weed control has developed into big dimensions. In 1944, he pointed out, there was practically no 2,4-D treatment in the state, but in 1948 some 12 to 13 million acres were sprayed in 13 midwestern states alone. In summarizing the performance records of herbicides other than 2,4-D, Mr. Stahler termed borax as "still the best chemical for control of leafy spurge." About TCA, he commented that it was suitable for control of grassy weeds, but that it is non-selective and rather expensive. It is good for control of quackgrass, he added.

"TPC," in his opinion, has been over-publicized, and is not particularly well suited for use

(Turn to page 69)

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President, Niagara Chemical Division, Food Machinery & Chemical Corp., Middletown, N. Y.

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Executive Secretary, NAC Association, Washington, D. C.

GEORGE F. LEONARD

Exec. Vice-President & Treas., Tobacco By-Products & Chemical Corp., Richmond, Va.

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Director, Sales Div., Grasselli Chemicals Department, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

E. H. PHILLIPS

Director of Purchasing, GLF Soil-Building Service, a Division of Co-operative GLF Exchange, Inc., N. Y.

FRED SHANAMAN

President, Pennsylvania Salt Manufacturing Co., Tacoma, Wash.

RUSSELL B. STODDARD

Coordinator of Insecticide Operations, U. S. Industrial Chemicals, Inc., New York.

F. S. WASHBURN

Director, Agricultural Chemicals Division, American Cyanamid Co., New York.

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INDUSTRY NEWS

APS Potomac Branch Elects

C. L. Lefebvre, U. S. D. A., Beltsville, Md., was elected president of the Potomac Branch of the American Phytopathological Society at the group's annual meeting held at Beltsville, Md., February 23 and 24. Vice President is Carl E. Cox, University of Maryland, College Park; and the secretary-treasurer, J. B. Demaree, U. S. D. A., Beltsville, Md., was re-elected. Paul R. Miller, U. S. D. A. Plant Disease Survey, Beltsville, Md., was re-elected counselor of the group.

"No DDT in Dairies": USDA

"DDT should not be used for insect control on dairy cows," the U. S. Department of Agriculture declared in a statement issued on March 24. Even small amounts of DDT in a food such as milk, a universal diet especially for infants and small children, might prove harmful in time, the statement points out, quoting from results of studies carried on for a number of years by toxicologists of the Food and Drug Administration.

According to the statement, methoxychlor, a DDT analog, might be substituted for DDT to control insect pests on dairy cows. It is made clear, however, that no change is being made in the Departments' former recommendations for the use of DDT to control insect parasites on other livestock, including beef cattle.

A number of new insecticides are under investigation by the U.S.D.A. for controlling insects on milk cows and in dairy establishments. In addition to methoxychlor, pyrethrum may be used, either alone or with some of its synergists. Among the latter, the statement indicates that piperonyl butoxide increases the killing action and lasting effect of

pyrethrum against horn flies, stable flies, tabanids and lice on cattle.

"Several insecticides such as DDT, chlordane and benzene hexachloride are useful for controlling flies in and around farm buildings, the department states. "Space sprays containing pyrethrum or organic thiocyanate compounds may be used in dairy barns and milk-processing buildings," it continues.

New Department for Shell

Formation of a new agricultural department to consolidate the marketing of all Shell Oil and Shell Chemical agricultural products has been announced by L. V. Steck, Marketing Vice President of Shell Chemical Corporation, New York City. The new department will direct national sales of anhydrous ammonia, ammonium sulfate, soil fumigants, insecticides and herbicides.

During the past ten years Shell Oil Company has manufactured and marketed a variety of insecticides for farm use, and since the war has developed a

number of weed killers and plant hormones to regulate plant growth. Sale of these items has been handled by the company's Special Products Department.

Helfrick Named by S-W



EARL C. HELFRICK

Earl C. Helfrick has been appointed by the Agricultural Chemicals Division of Sherwin-Williams Co. as central zone manager, according to Don S. Gaarder, division director. Mr. Helfrick is a native of Cleveland, Ohio, and a graduate of Wheaton College, Wheaton, Illinois. He has been with S-W for the past 19 years. In 1946 he was in charge of "Pestroy DDT" products, and later served as midwestern zone manager of the Agricultural Chemicals Division at Kansas City.

Purdue Crop Dusting Course

A two-day short course on Airplane Crop Dusting and Spraying was held at Purdue University on March 10 and 11. Prof. J. J. Davis, Purdue Department of Entomology, was in charge of the meeting which attracted custom operators from nine states outside of Indiana. Present were representa-

MEETINGS

Pacific Slope Branch, A.A.E.E., Bright Angel Lodge, Grand Canyon, Ariz., June 16, 17 and 18.

2nd. Annual Texas Weed Conference, Amarillo, Tex., April 21, 1949.

National Agricultural Chemicals Association (AIFA), Annual Spring meeting, Westchester Billmore Hotel, N. Y., May 5-6, 1949.

Natl. Assn. of Insecticide & Disinfectant Mfrs., Chicago, June 13-14.

National Fertilizer Association, Greenbrier Hotel, White Sulphur Springs, W. Va., June 13-15.

American Plant Food Council, Hotel Mt. Washington, Bretton Woods, N. H., June 19-22, 1949.

tives from Illinois, Ohio, Michigan, Connecticut, Kentucky, Wisconsin, Florida, Missouri and North Dakota. A total of 104 persons registered.

A rather comprehensive picture of the problem of the use of aircraft in agriculture was given by the various speakers, including members of the Agronomy, Botany, and Entomology Departments at Purdue; Col. C. F. Cornish and Keith Pettigrew of the State Aeronautics Commission; Paul Uman of the State Entomologist's Office; Edwin A. Joyce of the Civil Aeronautics Administration; Arthur Darlington of the Anderson, Indiana Airport; Virgil Helgen, President of the Illinois Association of Airplane Sprayers and Dusters; and George C. Decker, Entomologist of the Illinois State Natural History Survey.

Dr. Sherwood is Appointed

Monsanto Chemical Co., St. Louis, Mo., has announced the ap-

pointment of Dr. Lloyd V. Sherwood as assistant coordinator of the Agricultural Chemical Group of the company's Organic Development Department. The announcement was made by Lynn A. Watt, director of the department.

Dr. Sherwood's work will be principally in the field of herbicide development and application. He is a graduate of the University of Illinois, with a major in agronomy and a minor in plant physiology. During the war, he was an officer in the Army Air Forces.

New Company Formed

The Tralon Company has been established in Chicago to operate as manufacturers' representatives for the paint, chemical, insecticide and foundry fields, it was announced in March by Noble L. Mooneyham and John C. Lunkes, owners. Both Mr. Mooneyham and Mr. Lunkes were formerly associated with Velsicol Corporation in Chicago.

NAIDM Meets in Chicago

The National Association of Insecticide and Disinfectant Manufacturers will hold its annual meeting at the Drake Hotel, Chicago, on Monday and Tuesday, June 13 and 14, it has been announced by the Association.

Walker Joins Pennsalt Div.

The appointment of Nicholas M. Walker to the Packaging and Labeling Division of Pennsylvania Salt Manufacturing Company to assist in matters relating to labeling and registration of Pennsalt products, has been announced.

Mr. Walker, a graduate of N. Carolina University, joined Pennsalt in 1945 after four and one-half years with the Army's Chemical Warfare Service. He replaces Joseph A. Noone, technical advisor on labels and registration, who resigned March 1 to become associated with the National Agricultural Chemicals Association.



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Beetle Quarantine Area Extended

The U. S. Department of Agriculture has announced that moderate extensions have been made of the area regulated because of an infestation of white-fringed beetle. Effective March 17, the extensions include areas in Tennessee along with parts of additional counties or parishes in the previously quarantined States of Alabama, Florida, Georgia, Louisiana, Mississippi and North Carolina.

Paper on Toxicology

A paper by Dr. Arnold J. Lehman of the Division of Pharmacology, Food & Drug Administration, Federal Security Agency, Washington, on the subject of "The Major Toxic Actions of Insecticides" has been reprinted by the National Pest Control Association, Inc., 3019 Fort Hamilton Parkway, Brooklyn 18, N. Y.

The paper summarizes the more important toxicological features of the commonly used insecticides. It points out that of the thousands of formulations used, not more than 25 insecticides are involved. The solvents, diluents and wetting agents have some bearing on the toxicity of the formulation, the paper reminds, so in the experiments described in the paper, poisons of high purity were administered.

Dr. Lehman's paper was originally presented before the meeting of the New York Academy of Medicine in January, 1949.

Hyman Office Moves

Julius Hyman & Co., Denver, have announced that their west coast offices have been moved from the former Main St. location in San Francisco to new quarters at 25 Beale St., San Francisco 5, Calif. In charge of the new office is Edward Degginger.

New Kans. City Office

Rohm & Haas Co. has announced that the office of the sales department of its agricultural and

sanitary chemicals department in Kansas City is now located in room 603, Midland Bldg., 1221 Baltimore Ave., Kansas City 6, Mo.

Williams in So. Territory

Velsicol Corporation, Chicago, has announced that Ralph E. Williams is now the company's representative for the sale of technical chlordane and the company's insect toxicant solvents, in the states

of Florida, Georgia, North Carolina and South Carolina. Mr. Williams will make his headquarters at 1134 W. Yates Ave., Orlando, Fla. His training as an entomologist will enable him to give technical assistance to the trade.

Velsicol has also announced that as of April first, it will carry warehouse stocks of technical chlordane in the Carolina Bonded Storage Co. at Columbia, S. C., to service accounts in that area.

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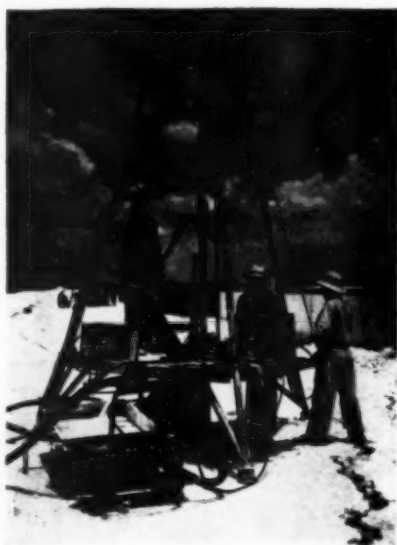
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Fertilizer News

APFC Program Announced

Rep. Harold D. Cooley (D-N.C.), chairman of the House Agricultural Committee, will be among the major speakers at the fourth annual convention of the American Plant Food Council at The Mount Washington Hotel, Bretton Woods, N. H., June 19-22.

Clifton A. Woodrum, president of the Council, has announced that other speakers on the program will include well-known soil scientists, Government agricultural leaders, educators and National 4-H Club leaders. Rep. Cooley will speak at the Council's annual banquet at 7:30 P.M., June 21.

The business session of the convention June 20 will begin with an address by Mr. Woodrum, followed by an agricultural panel on "Fertilizer, Farming and the Future" with Dr. Paul D. Sanders, Richmond, Va., editor of "The Southern Planter" and immediate past president of the American Agricultural Editors' Association, as moderator.

Other panel speakers will include Rep. Charles B. Hooven (R-Iowa), member of the House Agriculture Committee; Dr. Robert M. Salter, chief, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.; and Dr. Robert T.

Chandler, Jr., director, New Hampshire Agricultural Experiment Station and dean, College of Agriculture, University of New Hampshire at Durham.

Dr. William I. Myers, Dean of Agriculture, State College of Agriculture, Cornell University, Ithaca, N. Y., will be the principal speaker on the morning program, June 21.

Joseph A. Howell, executive vice-president of the Virginia-Carolina Chemical Corporation, Richmond, Va., is chairman of the convention committee which includes C. B. Robertson, president, Robertson Chemical Corporation, Norfolk, Va., and Fred J. Woods, vice-president, Gulf Fertilizer Company, Tampa, Fla.

NFA To Greenbrier

A full program of speakers including prominent representatives of various branches of agriculture and related industries is nearing completion by the National Fertilizer Association, for its 24th Annual June Convention at the Greenbrier Hotel, White Sulphur Springs, W. Va., June 13-15.

Although the program had not been fully completed at press time, Association spokesmen said that among those who had already accepted the NFA's invitation to speak, were Louis Bromfield, Lucas, Ohio, author of "Malabar Farm" and other volumes on the subject of agriculture; Charles H. Mahoney, director, National Canners Association, Washington, D. C.; and John H. Davis, secretary, National Council of Farmer Cooperatives, Washington, D. C.

Also to appear on the program is the NFA president, Dr. Russell Coleman, and Ray King, Valdosta, Ga., chairman of the NFA board of directors. The annual meeting of the Association's board will be held on the morning of June 13, and the general sessions of the convention will be held in the morning of the following two days. The annual dinner will be held on the evening of Tuesday, June 14.

Chairmen for sports contests have been named as follows: golf, A. L. Walker, Jr., Texas Gulf Sulphur Co., New York City; ladies golf, Mrs. J. E. Totman, Baltimore, Md.; tennis, James C. Totman, Summers Fertilizer Co., Bangor, Me., and horseshoe pitching, A. A. Schultz, Reading Bone Fertilizer Co., Reading, Pa.

Much of the program planning for the American Plant Food Council during 1948-49 was done by the organization's Executive Committee, (right) members of which will have important roles at the 1949 convention, June 19-22. They are (l: to r:), bottom row: Paul Speer, vice-president, U. S. Potash Company, New York City; Fred J. Woods, vice-president, Gulf Fertilizer Company, Tampa, Fla., chairman; A. F. Reed, vice-president, Lion Oil Company, El Dorado, Ark.; top row: W. T. Wright, vice-president, F. S. Royster Guano Company, Norfolk, Va.; C. B. Robertson, president, Robertson Chemical Corporation, Norfolk and Robert C. Simms, president, Naco Fertilizer Company, New York. (Photo by American Plant Food Council)



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New Posts at Union Bag

Union Bag and Paper Corporation, N. Y., has announced a number of promotions and new appointments in its sales organization. Among those advanced by the company are S. K. Bradley, former director of Chain Store Sales, who becomes Eastern district manager of Multiwall Sales; R. B. Bennett, who becomes district manager of Flexible Packaging Sales; R. C. Shamon who has been made assistant to the director of Flexible Packaging Sales; and W. F. Jacobi who has been made head of Marketing Research and Development in Flexible Packaging Sales.

Additions to the sales staff include J. P. Schwede, formerly of Standard Oil of New Jersey; Charles Bond and Ryan Loftus, both formerly with Royal Bag Co. in New England, who will cover that territory for Union.

Calif. Ass'n Meets in Nov.

The California Fertilizer Association has announced that its 26th annual convention will be held at the Palace Hotel, San Francisco, November 7, 8 and 9. C.F.A. President Earl Mog, Growers Fertilizer Co., Stockton, has announced the appointment of the convention program committee as follows: Murray McNeil, Swift & Co., Hayward, Calif., chairman; Earle E. Kaplansky, K. W. MacDonald Co., Watsonville.; Ralph J. Crum, Pacific Guano Co., Berkeley; and Dr. Oliver Overseth, executive secretary of the California Fertilizer Association.

Potash from Dead Sea

Production of potash at the rate of 70,000 tons annually through operations at the southern end of the Dead Sea is expected to begin now that an armistice has been signed between Israel and Transjordan, it has been announced by Palestine Potash Limited, a company

which holds a seventy-five-year concession to develop and exploit Dead Sea mineral resources. The concession was obtained in 1930 from the British mandatory Government. The company will also pay royalties to both Israel and Transjordan, a spokesman said.

U. K. Fertilizer Use Up

Consumption of fertilizer

materials has more than doubled in the United Kingdom since 1939, according to figures published in a booklet entitled "Fertilizers During the War and After," by E. M. Crowther, head of the chemistry department, Rothamsted Experimental Station, Harpenden, Herts, England. A total of 186,000 tons of nitrogen were consumed in 1948 compared

(Turn to page 64)

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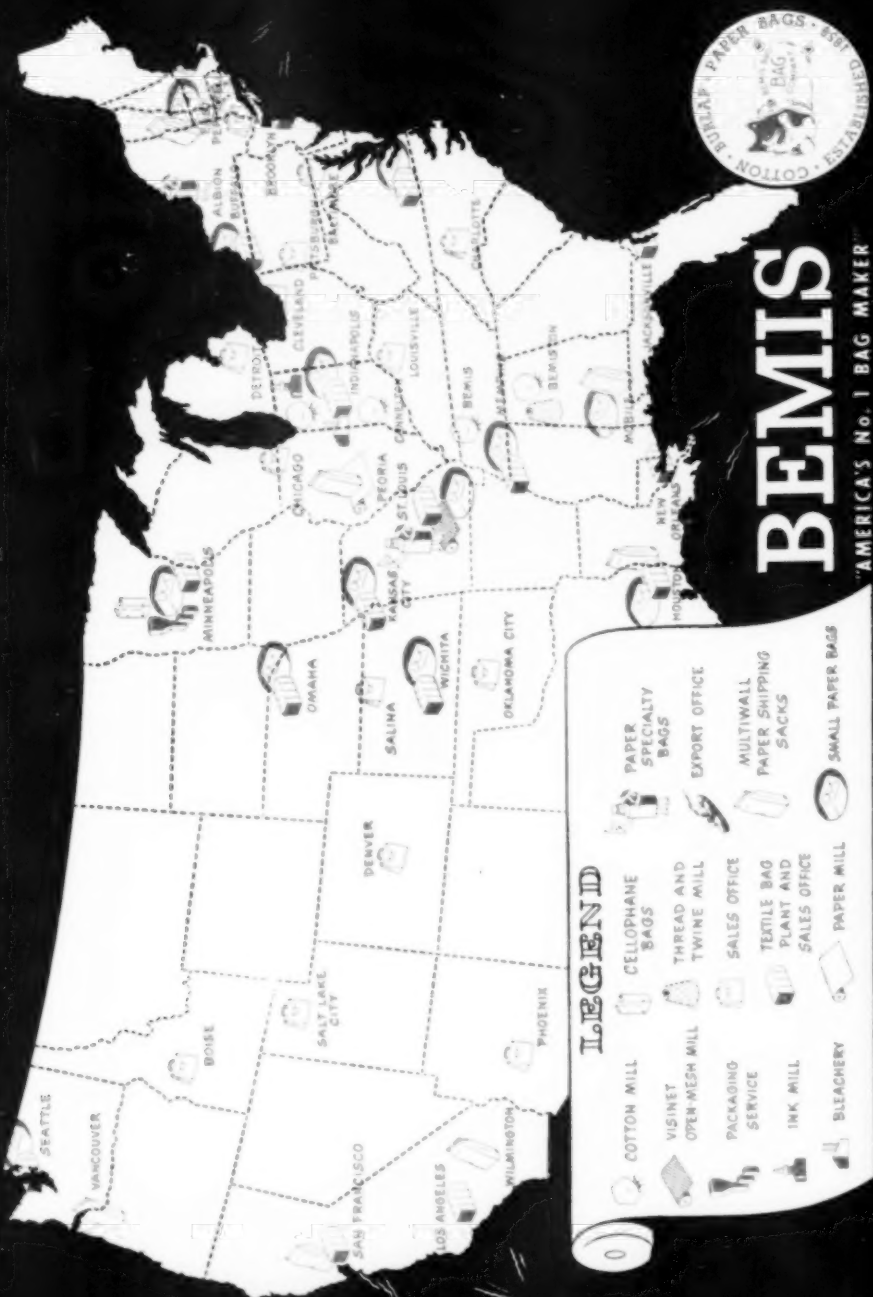
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Compare Payloader Performance

- ✓ One HA Payloader unloads a box car of superphosphate in 2½ hours, traveling 200 ft. round trip to the stockpile. Formerly took 5 men, 4 hours. Also saves 40 manhours per car unloading bagged ammonium nitrate.
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- ✓ Unloading box cars of chemicals, also hauling fertilizer 150 feet to mixer, one Model HA Payloader and operator does in one hour as much as 15 men working 5 hours.
- ✓ Model HA Payloader unloads box cars of phosphoric acid. Compared to previous method, it has cut unloading time in half and saves 88 manhours of labor per car.
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to 60,000 in 1939; and the score for P_2O_5 stands at 372,000 to 170,000 tons for 1948 and 1939, respectively. Some 190,000 tons of K_2O were used in 1948 compared to 75,000 tons in 1939. The figure increased each year throughout, until 1947, when the totals fell somewhat below those of the previous year. In 1948, however, new marks were set on all counts.

the title of Bulletin 525, issued recently by the Connecticut Agricultural Experiment Station, New Haven. The booklet reviews the state laws covering commercial fertilizer materials, and presents a report of fertilizer inspections for 1948. The data was compiled under the direction of H. J. Fisher, chemist in charge.

harie, N. Y., have announced the appointment of H. C. Peterson to the position of Assistant Sales Man-

Conn. Fertilizer Report

"Commercial Fertilizers" is

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H. C. PETERSON

ager. Mr. Peterson was formerly sales manager of the Metropolitan New York area. He is succeeded by H. S. Hollingsworth.



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Potash Use Increases

An increase of 82,818 tons of K_2O , or 7.6 percent over the previous year, was reported recently for 1948, by the American Potash Institute, Washington, D. C. Deliveries of potash in North America were maintained at a high rate throughout the year, when the five leading producers and three importers delivered 2,202,036 tons of potash salts containing an equivalent of 1,173,842 tons of K_2O .

The potash delivered in the U. S. went to 45 states and the District of Columbia, with Georgia and Ohio each receiving some 88,550 tons for the leading position. Following in order were Illinois, Virginia, North Carolina and Florida, each of which took more than 60,000 tons during the year.

Bemis Adds Label Space

Bemis Bro. Bag Co., St. Louis, has announced the production of bags with an added 2-inch brand-label strip at the bottom of the bag to afford an additional

AGRICULTURAL CHEMICALS

identification strip so that stored bags may be quickly identified regardless of how they are stacked. The new arrangement makes five of the bag's six sides available for printing.

Fertilizer Exports Up

Canadian exports of fertilizers in 1948 increased almost \$2,000,000 in value over those of 1947, according to U. S. Department of Commerce reports. Totals were \$36,374,000 and \$34,386,000 respectively.

Collier to Ga. Territory

Synthetic Nitrogen Products Corp., New York, has announced the appointment of Clifford Collier as Georgia representative for the firm's product "Cal-Nitro," a nitrogen fertilizer compound. Mr. Collier is an agronomist, a graduate of the University of Georgia, and for five years was county agricultural agent in Peach and Warren Counties, Ga. He was in the armed forces for five years, during part of which time he was Food and Agriculture Officer in Germany. He was discharged from the army in 1948 with the rank of Lt. Colonel.

Bemis Film Announced

A new sound-color motion picture, "A Stitch in Time" has been produced by the Packaging Service Department of Bemis Bro. Bag Co., St. Louis, as a supplement to the company's long-established sewing machine clinics. The 16mm. film runs about an hour, covering the installation, operation, maintenance and repair of the major types of bag sewing machines.

CFA in New Quarters

A new headquarters in Los Angeles has been announced by the California Fertilizer Association through its executive secretary, Dr. Oliver Overseth. As of



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(Chlorate Weed Killer)
Atliade With 2,4-D
Atlas "A"
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Chipman General
(Dinitro Weed Killer)
Chlorax Weed Killers
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2,4-D Weed Killers
(Amine, Ester, Sodium Salt)

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April first, the CFA offices are located at 403 West Eighth Street, Suite 710-711, Los Angeles 14.

The former offices were located on West 6th St. also in the same city.

DDT Poison Articles Discounted

A RECENT series of articles on "DDT and You — How it Menaces the Nation's Health" appearing in the *New York Post*, daily tabloid, claims that millions of people are being slowly poisoned by the widespread use of DDT. The series, written by Albert Deutsch, points out that DDT is causing cumulative toxic effects in humans, especially children. Numerous human ills are charged to DDT, and he quotes one Dr. Morton S. Biskind of New York as having had "first-hand experiences with hundreds of DDT poisoning cases." Dr. Biskind, he said, believes that the Virus X disease is in fact DDT poisoning.

Opinion in the insecticide industry regarding the Deutsch series was generally that the articles were "sensationally written misinformation." It was pointed out that the Deutsch interpretation of many of the facts which he presented was essentially warped and without foundation.

The sensational character of the articles attracted wide attention, however, and resulted in a meeting being called in Washington which was attended by a hundred representatives of various government agencies. Following the meeting, a statement was issued by the Food and Drug Administration, Public Health Service, U.S.D.A., and the Army and Navy Departments, discounting the Deutsch reports.

The joint government statement appears, in part, as follows:

"A number of statements have been published during the last several days which have misled and alarmed the public concerning the hazards of using DDT as an insecticide. DDT... has been used with marked success in both the control and prevention of such insect-borne diseases as malaria and typhus and of insects which are destructive to crops and injurious to livestock and infest homes.

"It is well recognized that DDT, like other insecticides, is a poison. This fact has been given full consideration in making recommendations for its use. There is no evidence that the use of DDT in accordance with the recom-

mendations of the various Federal agencies has ever caused human sickness due to the DDT itself. This is despite the fact that thousands of tons have been used annually for the past four or five years in the home and for crop and animal protection. However, minor toxic symptoms may be produced by kerosene and various solvents used in DDT and practically all other insecticidal mixtures.

"Statements that DDT is responsible for causing the so-called 'virus X disease' of man and 'X disease' of

BULLETIN

A late development in the DDT picture is a warning issued by U.S.D.A. that all labels recommending DDT for use on dairy animals or on forage or other feeds for dairy animals or animals being finished for slaughter, must be "appropriately revised" before any movement in interstate commerce or within any territory of the U.S. or District of Columbia. In the case of products already packed, the Department warned, this may be done by the addition of sticker labeling bearing appropriate wording, or, by use of a precautionary statement either overprinted or applied with a rubber stamp. Revisions must be submitted to the Insecticide Division, Production and Marketing Adm., USDA, Washington 25, D.C.

cattle are totally without foundation. Both of these diseases were recognized before the utilization of DDT as an insecticide.

"The Food and Drug Administration has not prohibited the use of DDT in spraying dairy cattle and barns. The Federal Food, Drug and Cosmetic Act requires the Food and Drug Administration to insure that the food supply of the American people does not contain any poisonous or deleterious substance that is not necessary in the production of the food. Studies by the Bureau of Entomology and Plant Quarantine have shown that DDT when used on dairy cattle or when present on fodder fed to dairy cattle may appear in the milk. They also say that DDT in small quantities can be detected sometimes in milk, following ordinary use of the insecticide for fly control in dairy barns. Because of the vital importance of milk in the diet of infants, children and people of all ages, it is essential that proper precautions be taken to protect the milk supply. Modifications of the recommendation made by the Department of Agriculture on the use of DDT on dairy cattle were made merely as a precautionary measure.

"There is no justification for public alarm as to the safety of the milk supply from the standpoint of DDT contamination."

SUPPLIERS' BULLETINS

Grasshopper Booklets Out

Hercules Powder Company,

Wilmington, Del., has issued two recent folders on toxaphene. One, entitled "Facts About Toxaphene" lists all of the insects to be controlled by the insecticide, with a map showing expected grasshopper infestations in 1949, and progress reports on tests made with the material.

The other booklet, devoted entirely to control of grasshoppers, presents eleven large photographs of the insect, depicting what happened when the pest contacts toxaphene. Title of the booklet is "Toxaphene Kills Grasshoppers."

Sprayer Bulletins

John Bean Division, Food Machinery and Chemical Corp., Lansing, Mich., has recently issued descriptive literature on its "Spartan" high pressure power sprayer. The machine is adaptable for various types of application, the bulletin states, developing pressures up to 200 pounds at the nozzle, and as low as 10 pounds for weed killing and other spray jobs.

Nozzle Information Given

Dow Chemical Company's "Chemical News for Western Agriculture," a monthly publication, carries in its March issue information on treatment of avocado and citrus replant locations, cotton and soil fumigation, and a comprehensive discussion of how to choose spray nozzles. Four tables are presented, giving accurate information on gallons per minute which must be discharged at certain speeds and under certain conditions where holes are 12, 18, 20, 24 or 30 inches apart. The tables, reproduced by permission of Chemi-Serve, Inc., Seattle, Washington, also include various nozzle capacities, by brand names. Copies may be had from Dow's Great Western Division, P. O. Box 245, Seal Beach, California.

New Edco Product

Edco Corporation, Elkton, Md., has announced the production

What's Your Problem?

Aphid Spray

Nicotine Base
for Dust

Controlling Poultry
Roundworm
(*Ascaridia galli*)

Delousing
Poultry

Dip and Drench
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Control of Certain
Cattle Lice

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2. BLACK LEAF 155 — for spraying apples and pears to control codling moth, also for controlling grape berry moth.
3. BLACK LEAF DRY CONCENTRATE — used as a spray or dust — a dry powdered nicotine compound for easy mixing and handling.
4. BLACK LEAF 155 WITH DDT — for spraying apples and pears for the control of codling moth, leathoppers, and similar pests.
5. BLACK LEAF 10 DUST BASE — meets the demand for a nicotine compound easily mixed with non-alkaline carriers to make a neutral dust.
6. BLACK LEAF CUNIC DRENCH — for sheep and goats. Formula recommended by U. S. Department of Agriculture.
7. BLACK LEAF POWDER AND PELLETS — for controlling the large roundworm (*Ascaridia galli*) in chickens.
8. MASH-NIC — for mixing with poultry feed to control large roundworm.
9. NICO-FUME LIQUID — for greenhouse spraying and fumigating — especially refined.
10. NICO-FUME PRESSURE-FUMIGATOR — spreads penetrating fumes under pressure — controls aphids and similar insects in greenhouses.

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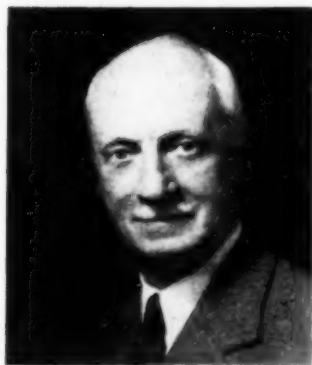
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R. W. GREEFF & CO, INC.

of a 15% Wettable Parathion powder, known as "Edco 15." The material is said to be an economical, easy-to-use powder, effective against a wide range of insects.

• Poole of Derris Retires

Otis M. Poole, president of Derris, Inc., New York, and a director of Dodwell & Co., Ltd., announced his retirement as of April 1, rounding out 54 years of



Otis M. Poole

service. He was succeeded by Emil L. (Ed) Dahlin as president of Derris while Guy Dodwell will take over his activities as general manager of Dodwell & Co.

• Pacific Slope AAEE Meets

The Pacific Slope Branch of the American Association of Economic Entomologists will hold its 33rd annual June meeting at Grand Canyon, Arizona, June 16, 17 and 18. Meeting headquarters will be at the Bright Angel Lodge.

Although the full program had not yet been completed at press time, Dr. Roy E. Campbell, Alhambra, Calif., Secretary of the Branch, stated that topics to be discussed include "The Mode of Action of New Insecticides," "Synergists for Insecticides," "Insecticidal Resistance to DDT and Other Insecticides," "New Equipment for Insecticide Application" and "Biological Control and Insect Pathology."

V-C Reorganization Slowed

Although stockholders of Virginia Carolina Chemical Corporation, Richmond, approved the Corporation's recently-proposed plan of recapitalization, the majority favoring the move was less than 98 per cent required by Virginia laws, to make the plan automatic.

Under Virginia laws, dissenters have the right to demand "fair cash value" for their holdings.

SOUTH DAKOTA CONF.

(Continued from page 51)

under South Dakota conditions, although "it may be good elsewhere." "PCP," he said, kills weeds all right, but is costly and also tends to damage other crops at the same time. As for 2,4,5-T, Mr. Stahler stated that it is a good herbicide in its place, but that it controls only woody weeds.

Summing up other herbi-

for a 100% job on the
CORN BORER
support
5% DDT
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DILUEX

For effective dust control of the Corn Borer, current recommendations are to use 5% DDT applied 40 pounds to the acre by ground machinery, or 10% DDT applied 20 pounds to the acre by aircraft.

By either method, uniform discharge and distribution of the toxicant is very important. This will be promoted to the highest degree if the dust is conditioned with 10 to 40% of Diluex. Oil-impregnated or liquid-impregnated dusts also can be effectively conditioned for high flowability and uniform discharge with Diluex. An independent test of diluents using aircraft equipment, gave Diluex a rating of "good foliage coverage, uniform settling, and very little lateral drifting." To assure satisfactory dusting, reduce abrasion, and improve adhesion, use Diluex. Write for data sheet and samples.



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cides in a blanket statement, he said that "many new chemicals are coming along, but we don't know how they will turn out until they have been tested thoroughly."

The remainder of the afternoon program was devoted to reports by county weed supervisors of their activities. Several told of efforts to gain the cooperation of townships within the coun-

ty, one stating that every township in his county had appropriated from \$500 to \$1,200 for weed control. This was in addition to a county allocation of \$6,300 for promotion of the program.

Cattle Pests Discussed

A DISCUSSION of control of cattle parasites was launched, with L. E. Johnson, head of the animal husbandry department of

S. D. State College speaking on "Research Results in Livestock Pest Control." He said that more needs to be known about the types and life histories of grubs and heel flies; more about how to kill the insects, and greater efforts in the establishment and maintenance of grub free areas. He stated that conditions in his state may be different from those of other areas where cattle pest control programs have been successful. After reviewing tests made with a number of insecticidal materials, he said that "we really haven't been able to prove that grub-free cattle have any advantage in the feed lot; but we can say that spraying kills grubs and speeds up gains." It was noted, he said, that in the economy of gain, sprayed cattle have topped the others every year of the tests. He also stated that it was impossible to kill all of the grubs in a given area in a single year, even by spraying five times during the season. South Dakota has a difficult grub problem, Mr. Johnson said, because both species of the pest are present. "But," he added, "if we want to produce good hides, we have to hold down grub infestation."

Weed Control Panel

A PANEL on "Equipment for Weed and Livestock Pest Control" consisted of Mr. O'Connell; Louis Lubinus, extension agricultural engineer at S. D. State College; Lyle Derscheid, and L. M. Stahler.

Mr. O'Connell stated that both low and high pressure sprayers have their respective places in the control of livestock pests. The high pressure method is preferred, he said, because it drives the insecticide into the animal's skin and thus requires a smaller amount of chemicals.

Mr. Lubinus compared the advantages of three common types of sprayers: tractor mounted;



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skid-mounted; and trailer mounted. The tractor-mounted needs but one operator, he pointed out, and moreover, the rig is high enough for all crops; has sufficient power; enables driver to see where he is going; makes fewer tracks in grain; and is less expensive. Disadvantages, however, include the inconvenience of putting equipment on and off the tractor.

Willard Dow Dies in Crash

Dr. Willard H. Dow, 52, president of Dow Chemical Co., Midland, Mich., and his wife were



Leland I. Doan

among five persons killed near London, Ontario, on March 31 in the crash of a private plane operated by the company.

To succeed Dr. Dow as president, the board of directors on April 5, named Leland I. Doan, formerly vice-president and secretary. Earl W. Bennett, formerly vice-president and treasurer, was elected chairman of the board.

A graduate of the University of Michigan, Dr. Dow joined the company founded by his father, the late Herbert H. Dow, in 1919. He became president and general manager in 1930. Dr. Dow received a number of awards, among them the Charles Frederick Chandler Medal of Columbia University in 1943, and the 1946 medal of the American Section of the Society of the Chemical Industry.

The Dow Chemical Co., is one of the major chemical producers in the U. S., with the output of agricultural chemicals comprising an important part of the production.

N. CENTRAL A4EE

(Continued from page 36)

of the dangers that laymen tend to overlook.

Speaking of toxicity of parathion, Dr. Ray Hutson, Michigan State College, said its effects lie between that of nicotine and

tetraethyl pyrophosphate, they being greater than that of nicotine, but somewhat less than for the TEPP.

Dr. F. W. Poos, USDA, Beltsville, Md., reviewed feeding test with cows and sheep, using pea vines treated with DDT for insect control. There were no ill effects, he said, but the cows showed appreciable amounts of DDT in their fat. When silage treated with DDT aerosols for pea aphid control was fed to cows, no appreciable amount was found in the milk. Most feeding doses,

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he commented, are too high and work is needed on lower dosages.

Dr. Harold Gunderson, Iowa State College, Ames, Ia., told of tests with four different kinds of pyrenones as dusts and sprays to control insects in alfalfa and red clover. Pyrenone, he remarked, "is about the only insecticide the Food and Drug people don't look on with suspicion." Tests made with relatively weak formulations of Pyrenone, he said, produced negative results against certain insects.

In North Dakota no satisfactory control has been found against weevils in sweet clover seedlings, Dr. J. A. Morse of the Fargo station, reported. On second-year plants a 3 or 5 percent dust gave satisfactory control. He advised early application to arrest damage.

In a panel discussion of the need for cooperative research in entomology, Dr. J. J. Davis, Purdue University, outlined ways in which manufacturers of chemicals and equipment for insect control could advance their own interests. He suggested, among others, research in their own plants as well as support of research at the experiment station, through fellowships and scholarships.

SEQUESTERING 2,4-D

(Continued from page 29)

phenoxyacetate is physiologically active in this form. At any rate, clogging of spray nozzles may be prevented in this way.

In concluding, it might be noted that alkali earth and metal sensitive agricultural chemicals are not limited to the carboxylic acids. Dinitro ortho-cresol, for example, forms a relatively insoluble calcium salt, the precipitation of which may be prevented by ethylenediamine tetraacetic acid. Quaternary ammonium compounds which are used to some extent in agriculture as orchard sprays show decreased bactericidal activity when diluted with hard

water although precipitation may not occur. "Sequestrene," unlike the polyphosphates, is compatible with cationic surface-active agents and may be used with quaternary ammonium compounds to counteract the deleterious action of hard water.

BHC FLY CONTROL

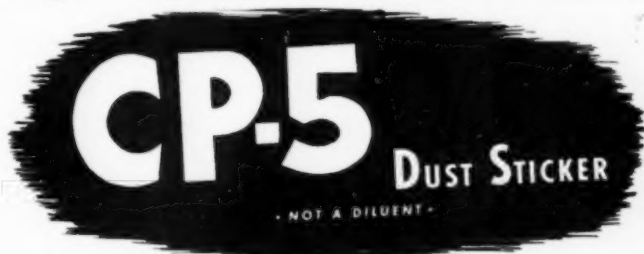
(Continued from page 32)

plish satisfactory fly control in Southern California areas during

1948 has been the development of fly resistance to DDT and related materials. This resistance to DDT has developed to such a magnitude in some of the fly strains collected in the field, that it is virtually impossible to obtain 100 per cent knockdown and kill of the flies by means of residual DDT spray treatments.

Field studies have shown that benzene hexachloride appears

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to be the most satisfactory material of those treated for the replacement of DDT in residual sprays in dairies and comparable outdoor situations. This material used at 17 pounds of a 12 per cent gamma-isomer wettable powder in 100 gallons of spray (approximately 0.25 per cent gamma-isomer) accomplished effective control for three weeks to one month during the hottest summer weather and up to two months during the cooler fall weather.

Some of the other spray materials discussed above may give satisfactory fly control in certain situations although consistent control was not obtained with their use.

NACA MEETING

(Continued from page 33)

ber of the NAC Membership and Information Committee. Although the roster of this forum had not yet been completed at press time, it was indicated that at the conclusion of the formal discussion, questions from the audience will be heard, with answers forthcoming from various members of the panel.

Aside from the formal program, the NAC board of directors will hold its regular meeting, and all of the committees will be in session at various times. Reports will be heard from representatives of the different committees, summarizing developments since the Spring Lake meeting last September.

Mr. Hitchner states that there will be no special banquet this year, although there are plans for an informal get-together on the evening of Thursday, May 5.

LISTENING POST

(Continued from page 49)

the course of routine soil inspections of potato fields, were found to contain *Heterodera punctata*. This is the first time this species has been recorded in the United States. It was originally described as the cause of poor growth of wheat in

Saskatchewan. According to plant pathologists in that area, it caused considerable trouble when first encountered, but later seemed to disappear. The same species has been recorded on the grass *Agrostis* in England, and British workers are of the opinion that *Agrostis* is its normal host. *Heterodera punctata* may well be common in this country. If the normal host is *Agrostis*, this could explain instances of poor wheat growth in newly-broken land.

PESTICIDE REPORT

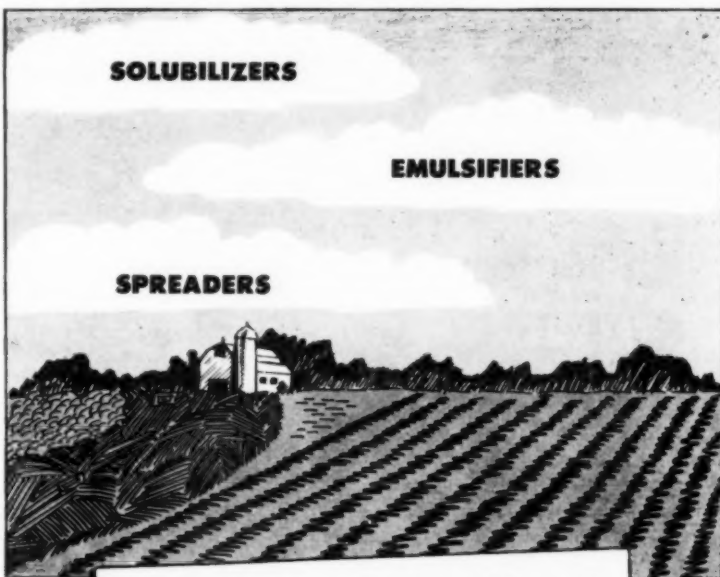
(Continued from page 41)

ment of DDT and other materials for fly control, is in only fair supply and the major producer of the material indicates that material will be available for experimental work on new development. However, it is not expected that there will be very large quantities particularly for the technical material for actual commer-

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ASARCO Monohydrated Zinc Sulphate has
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American Smelting and Refining Company

120 BROADWAY

NEW YORK 5, N. Y.

cial use during the coming season.

DDT

PRODUCTION of DDT in November 1948 (the last month for which production figures are available from the Bureau of Census and Tariff Commission) increased sharply with production during that month showing the highest output since September 1947. The production in November was 2,679,474 lbs. which compares with an October 1948 figure of 1,102,571 lbs. November 1947 production on the other hand, was 2,562,496 lbs. Most industry sources continue to quote technical DDT at 32c lb. in carload lots, but material is moving in the export field at prices lower than this. There are still stocks of surplus material around in the domestic market but many industry spokesmen feel that this condition will pretty well dry up within the next few weeks. It is indicated that there is a possibility of actual local shortage of technical DDT due to the falling off of production and the general uncertainty regarding DDT's future. However, there is still quite a use for technical DDT, and it is possible that there may be difficulty experienced during May and June in locating ready sources of supply.

2,4-D

THE Tariff Commission indicates that the March, 1948, production of 2,4-D presumably on the basis of 100% 2,4-D, was 2,301,436 lbs. which compares to the October production of 2,319,271 lbs. and a September production of 1,555,500 lbs. It is indicated that there will be a substantial quantity of 2,4-D preparations available for use during the coming spring and summer seasons.

Benzene Hexachloride

BENZENE hexachloride is showing increasing movement now that published recommendations for control of cotton insecticides include this material. Industry factors are

producing the finished insecticides and it is expected that there will be ample supplies of benzene hexachloride containing materials for use during the coming season. Census and Tariff Commission figures show a November, 1948, production of 1,137,205 lbs. having a gamma isomer content of 167,161. This compares to an October 1948 production of 1,447,378 lbs. with a gamma isomer content of 204,550.

With a weakening position

in the metals market, it is expected that the price of metallic chemical salts used in agriculture will show the same weakness during the next few weeks. As of this writing, the price of lead metal had declined some 2c lb. which will affect the price of lead arsenate. Copper, as of this writing, was firm but in view of the general weakness in the metal market, many industry spokesmen felt that caution was the word. Zinc is in about the same position.

DDT

100% technical grade

2,4-D

Acid • Sodium Salt

Tech. Isopropyl Ester

Tech. Butyl Ester

Tech. Methyl Ester

44% Isopropyl Ester Solution

40% Butyl Ester Solution

40% Triethanolamine Salt Solution

Kolker Chemical Works, Inc.

manufacturers of basic agricultural chemicals

80 Lister Avenue • Newark 5, N. J.

"PHYLLITE"

(TRADE NAME)

PYROPHYLLITE

The World's Greatest Diluent & Carrier
Absolutely Non-Abrasive and Adheres
Readily to Foliage and all Surfaces.

PHYLLITE'S UNIFORMITY IS UNSURPASSED

A chemical analysis run consistent in every batch of PHYLLITE assures the insecticide manufacturer of absolute uniformity for use as a diluent and carrier. PHYLLITE is ground in a Raymond Mill—95% through 325 mesh. Has a low pH (5.1).

IMMEDIATELY AVAILABLE

- Write us for helpful information and a generous sample.
- Packed in 50 lb. valve bags, 20 ton lots. Lowest prices on West Coast, F.O.B. plant.
- Smaller quantities if desired.

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Note these features:

1. Removable tip and strainer assembly. Unnecessary to disturb pipe connection for cleaning or changing sizes.
2. Milled flats tell direction of flat spray by "feel."
3. Threaded strainer cannot jar loose from vibration.
4. Produce absolutely uniform spray from edge to edge—no "end jets" to cause uneven coverage.
5. High velocity "non-fogging" penetrating sheet—an important factor where there is any wind.
6. Uniform capacities because of accurate machining.
7. Long straight wall orifice for extra wear—no "feather" edges to wear away quickly.
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AN EMULSIFIER OF PETROLEUM OILS Economical - Effective

MUL-SI-MO is especially adapted for the rapid emulsification of Oils whose viscosity is 120 Saybolt or less.

RANGE COVERED

Oils with a viscosity of 120 Saybolt or less cover the great majority of oils used in Disinfectant and Summer Sprays.

GENERAL TEXTURE

Mul-si-mo is a thin amber-colored oily liquid about the same viscosity as Kerosene Oil.

METHOD OF USE

There is nothing complicated about the use of Mul-si-mo. It is just poured into the oil to be treated at the rate of 1/2 to 1% depending upon the tightness of emulsion desired—then thoroughly stirred—and the process is completed.

RESULT OF MIXING AS ABOVE

A practically 100% Oil Product—No Water—No Soap—No Potash nor other Alkalies.

NEUTRAL PRODUCT

Mul-si-mo is Neutral. Mul-si-mo Made Emulsions are not adversely affected by pronounced

saline, alkaline or acid reacting waters.

ECONOMICAL TO USE —LOW COST

Mul-si-mo, we believe, is the cheapest and most economical Emulsifier on the market for the emulsification of the oils above specified.

NON-TOXIC TO PLANTS

Extensive tests have shown Mul-si-mo to be non-toxic to plants when used at a dilution of 1 to 100. (Plants used in tests—Cilous.) As summer oils are usually used at the dilution of half-gal. to 100 gals. water, at such dilution the rate of Mul-si-mo to water would be 1 to 20,000.

COST OF MUL-SI-MO

Per Gallon \$4.00, 5 Gallons and up @ \$3.75 per Gallon; 50 Gallon Drums @ \$3.50 per Gallon, f.o.b. New York or Jersey City. (Above prices for U. S. only. Foreign prices on request.)

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A 4 Oz. Sample will be sent upon request.

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month on the classified page
of

Agricultural Chemicals

254 W. 31st St.

New York 1, N. Y.

Industry Patents

2,462,057. Method of Producing Hexaethyl Tetraphosphate. Patent issued February 22, to Howard Adler, Flossmor, Ill., assignor to Victor Chemical Works. The method of producing hexaethyl tetraphosphate which comprises reacting not less than three moles of diethyl ether per two moles of phosphoric anhydride at from about 50° to 90° C. for a sufficient period to effect an intermediate exothermic reaction, cooling to maintain the temperature within said range, and then at the end of the exothermic reaction period heating at from about 90° to 110° C. under superatmospheric pressure for a period of time sufficient to form a substantial proportion of the tetraphosphate.

2,462,146. Stabilization of insoluble sulfur. Patent issued February 22 to Raymond H. Walcott, Cranford, and Alvin Schalls, Jersey City, N. J., assignors to Stauffer Chemical Co., San Francisco. A process of stabilizing insoluble sulphur against reversion to the form of sulphur which is soluble in carbon disulphide comprising dissolving a material selected from the group consisting of turpentine, pine oil, pine tar and rosin in a solvent therefor and mixing the resulting mixture into initially free-flowing and non-caking sulphur consisting predominantly of insoluble sulphur to uniformly distribute the mixture through the sulphur, said insoluble sulphur being insoluble in said solvent.

Finely divided solid sulphur containing sulphur substantially completely insoluble in carbon bisulphide as the predominant component thereof and a material selected from the group consisting of turpentine, pine oil, pine tar and rosin in an amount of only about 0.1% of the weight of the insoluble sulfur, said finely divided sulfur being free-flowing and non-caking prior to the addition of the material.

2,462,419. Spray gun. Patent issued February 22, to Donald J. Peeps, Toledo, Ohio, assignor to the DeVilbiss Co., Toledo. In a spray gun of the type described, a spray gun body with a flat annular surface at its forward end, the body having two air passages terminating in the flat annular surface with outlets spaced circumferentially apart but at points radially equidistant from the longitudinal axis of the body, an air dividing ring having a rearwardly extending generally cylindrical collar fitting against the flat annular surface of the body, an outwardly extending offset portion on one side of the collar overlying the outlet opening of one of said passages, an inwardly extending indentation on another side of the collar overlying the outlet opening of the other air passage, whereby air from the first mentioned air passage is directed within the collar and air from the second mentioned air passage is directed to the outside of the collar, a spray nozzle mounted in front of the air dividing ring, with a central air discharge port and laterally posi-

tioned air discharge ports, and means directing air from the center of the ring to the central port and air from the outside of the ring to the laterally positioned ports.

2,462,830. Fungicide Comprising 1-Methoxy-4-chlorobutene-2. Patent issued March 1, to Oliver W. Cass, Niagara Falls, N. Y., assignor to E. I. duPont de Nemours & Co., Wilmington, Del. A fungicidal composition comprising, as a fungicidal agent, 1-methoxy-4-chlorobutene-2 and as a carrier, a finely divided, inert solid.

2,462,835. Fly Spray. Patent issued March 1, to Harold W. Arnold and Norman E. Searle, Wilmington, Del., assignors to E. I. duPont de Nemours & Co., Inc., Wilmington. A fly spray composition comprising a solution of pyrethrum and an amide of a primary amine and a dicarboxylic acid having an unsaturated aliphatic carbon chain of at least 2 and not more than 3 carbon atoms linking the carboxyl groups, said pyrethrum being present in about five to about 95 milligrams per 100 cc. and said imide being present in the amount of at least about 10(100-P) milligrams per 100 cc. where P is the amount of pyrethrum in milligrams per 100 cc. of the fly spray.

2,463,085. Sacking Device. Patent issued March 1, to Jonas J. Byberg, Silverton, Oregon. In a sacking device of the character described, a pair of endless conveyors moving in transversely spaced planes, each conveyor passing over a supporting element at each end of its path, each conveyor carrying sack-engaging members at spaced intervals, the spacing of said sack-engaging members on each of said conveyors being such that when the mouth of a sack is attached to two sack-engaging members on each conveyor the mouth of the sack will be held open, means for delivering material to be sacked into the open mouth of a sack when so held, means for moving said conveyors, said sack-engaging members so mounted on said conveyors that when that portion of a conveyor on which one of said members is mounted passes around one of said supporting elements the sack-engaging members will be in open position with respect to the conveyor and will be in closed position with respect to the conveyor when the said portion of the conveyor is in straight line position.

2,463,653. Production of DDT of Improved Quality. Patent issued March 8 to Michael Sveta, Cleveland, Ohio, assignor to E. I. duPont de Nemours & Co., Inc., Wilmington, Del. In a process for producing DDT having a set point higher than about 90° C. the steps comprising sulfonating, with sulfuric acid having a strength of from 99 to 104.5% H₂SO₄, at least a part of the ortho, para isomer present in a

mixture comprising ortho, para and para, para isomers of DDT and separating the sulfonated material from the para, para isomer.

2,464,764. Spray Gun Apparatus. Patent issued March 15, to George N. Meyers, Audubon, N. J., assignor to the Budd Co., Philadelphia, Pa. In spray gun apparatus, a work receiving support, a spray gun having a nozzle, a sub-atmospheric pressure chamber between said support and nozzle, and connection means between the nozzle and chamber permitting pivotal shifting of said gun, said connection means comprising a yieldable annular plate surrounding an opening in the chamber wall and forming a sealing contact with said nozzle through which the outlet portion of the nozzle projects.

Trade Mark Applications

Eastern States, within a horse-shoe shaped arc, for fertilizers. Filed Mar. 5, 1948, by Eastern States Farmers' Exchange, W. Springfield, Mass. Claims use since Aug. 1, 1923.

Bo-Peep, in capital letters, with motif of shepherdess and three sheep, for fertilizers. Filed Mar. 13, 1948, by Gordon Callbeck, Denver, Colorado. Claims use since Aug. 4, 1947.

Wonder, in cheltenham caps and lower case letters, for weed killer and insecticide. Filed Sept. 30, 1946, by Cook Chemical Co., Kansas City, Mo. Claims use since May, 1945, on insecticide, and since April, 1946, on weed killer.

Emgeo, in capital letters roughly like a pyramid, for agricultural mineral. Filed Apr. 30, 1948, by Western Electrochemical Co., Los Angeles. Claims use since Mar. 19, 1948.

Pestmist, in capital letters, for chemicals for pest control. Filed May 28, 1946, by Michigan Chemical Corp., Saint Louis, Mich. Claims use since May 2, 1946.

Sunoco, in black capital letters with letters at each end of name taller than central letters, for insecticides. Filed July 1, 1947, by Sun Oil Company, Philadelphia. Claims use since June 14, 1947.

Resitox, in stencil-type capital letters, for insecticidal foliage spray oil. Filed Oct. 24, 1947, by Shell Oil Co., Inc., San Francisco. Claims use since Mar. 17, 1947.

No-Ratz, in capital letters, for rat paste. Filed Dec. 24, 1947, by Bell Chemical Co., Chicago, Ill. Claims use since June 5, 1936.

Racalan, in script letters, for weed killers and insecticides. Filed Jan. 20, 1948, by Deodor-X Company of England, Ltd., Liverpool. Claims use since 1947.

Classified Advertising

Rates for classified advertisements are ten cents per word, \$2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, \$1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 254 W. 31st St., New York 1. Closing date: 25th of preceding month.

positions open

Agricultural Sales: Established chemical firm requires man for field sales and service work in fumigants and allied chemicals. Dealer and consumer trade, willing to travel. Background in Horticulture or related fields desirable. Headquarters in Philadelphia. State experience and salary desired. Address Box 335, care of Agricultural Chemicals.

Salesmen: Two men required by large chemical manufacturing organization, one in northeast and one for south-eastern territory. Men who know and have sold agricultural chemicals to dealers and distributors. Preferably technically educated. Excellent opportunity in growing department. Give full details in letter to Box No. 336, care of Agricultural Chemicals.

positions wanted

Salesman: Chemist with three years experience in petroleum research and analysis and one year sales and field experience in insecticides—herbicides, desires sales position in Midwest. Well versed in agricultural chemicals, farm background, age 26, ambitious, personable, has car. Address Box 337, care of Agricultural Chemicals.

Insecticide Production: Young man desires supervisory position in charge of plant production. Seven years experience in production and packaging of wide variety of insecticides and fungicides. Experience in plant management. Address Box 338, care of Agricultural Chemicals.

Chemical Sales Executive: 35, well known, completely grounded in agricultural and industrial markets (bulk and consumer package). Product development, field research and sales administration. Knowledge organic fungicides, herbicides, insecticides, detergents, antiseptics, germicides, textile finishes, resins, rubber compounds, emulsifiers, degreasers. Seeks responsible position with progressive manufacturer chemical or allied field. Locate New York or environs. Address Box 339, care of Agricultural Chemicals.

Agricultural Chemical Salesmen desires new connection. Agricultural graduate with additional experience in field research. Contacts with sales outlets and experiment stations east of the Mississippi. Address Box 340, care of Agricultural Chemicals.

Chemist: Research and control chemist with leading manufacturer insecticide materials and allied chemicals desires new connection with manufacturer in allied field. Specialized in soils, insecticides, fungicides, emulsions, road building chemicals. Good record. Best references. For further details, write to Box 341, care of Agricultural Chemicals.

miscellaneous

Research Fellowships—Pest Control Chemicals: Two fellowship available July 1, paying \$1,344 plus tuition; one month vacation. Research on synthesis or biological testing of new chemicals against insects, etc. Permits 10 semester credits in agricultural chemistry and related subject towards M.S. and Ph.D. Applicant must have B.S. in chemistry, biochemistry or entomology (with strong chemistry minor). Send photograph and resume of training to Donald E. H. Frear, Dept. Agricultural and Biological Chemistry, Pennsylvania State College, State College, Pa.

Wanted: Used mixers (2) for dry free-flowing powdered products. Must be clean and in good condition. Capacities 200 lbs. and 1,000 lbs. respectively. State make, type, location, condition, and for what purpose previously used. Address Box 342, care of Agricultural Chemicals.

Will Purchase: Weighing and filling machine for packaging granular material in cartons up to five pounds. Used machine of recent manufacture wanted. Give full details. Address Box 343, care of Agricultural Chemicals.

ALVIN J. COX, Ph.D.
Chemical Engineer and Chemist
(Formerly Director of Science,
Government of the Philippine
Islands. Retired Chief, Bureau
of Chemistry, State of California,
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4 lb. Cans

Write today for full
information and prices

EDCO CORP.

ELKTON, MD.

NJ Mosquito Meeting

The 36th annual meeting of the New Jersey Mosquito Extermination Association was held March 23, 24, and 25 at Atlantic City, N. J. Hendrik Van Brederode, Midland Park, was elected president to succeed Louis B. Pierce, Trenton. Francis C. Stokes, Vincentown, N. J., became first vice president; and C. E. Krausse, N. Plainfield, was named as second vice-president. Dr. Bailey B. Pepper, New Brunswick, N. J., was re-elected administrative vice-president, as were the other officers: Thomas D. Mulhern, secretary, (who has held the position since 1932); George W. Eager, Newark, assistant secretary; and Lester W. Smith, Metuchen, treasurer.

Speakers on the program included Dr. F. C. Bishopp, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., Washington, D. C.; Dr. B. B. Pepper; Dr. Robert D. Glasgow, entomologist, Albany, N. Y.; Major F. W. Whittemore, Department of Army, Washington, D. C.; and Dr. Joseph M. Ginsburg, New Brunswick, N. J. The annual banquet was held on the evening of Thursday, March 24.

High Ammonia Production

Production of ammonium sulfate reached an all-time high in 1948, according to data compiled by the U. S. Bureau of Mines and the Bureau of the Census. The total was more than 1,057,000 short tons, the report stated. This total is about 4 percent. Technical synthetic ammonium sulfate accounted for 18.5 percent and the remaining 2.9 percent was produced at coke plants from purchased synthetic ammonia.

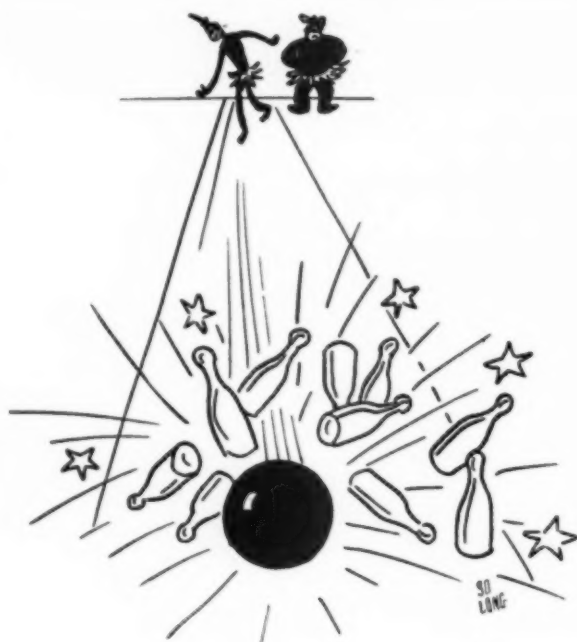
Fertilizer Plant Under Way

A new phosphate fertilizer plant at Wendell, Idaho, is nearing completion, and production is expected to begin early in the summer.

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AGRICULTURAL CHEMICALS
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TALE ENDS

THE announcement of M. R. Stephens of the Chicago office of Food and Drug Administration that "it will be impossible to use DDT as a spray on dairy cows or on the interiors of dairy barns, since such use will result in production of contaminated milk," hit like a bombshell the entomologists and other scientists assembled at the recent Milwaukee meeting of the North Central States Branch of the A.A.E.E., our editorial representative reports. Mr. Stephens continued by stating that enforcement procedure will be similar to that followed against all contaminated foods.

Our reporter states that on the evening of that day, the regularly scheduled program on other subjects was almost completely set aside in favor of an "indignation meeting" of many of those attending. This session, the reporter says, carried on "close to midnight."

Dr. E. F. Knipling, U.S.D.A. Bureau of Entomology and Plant Quarantine, in answer to a request for a statement, said that it has always been the policy of the B.E.P.Q. to "go along" with Food and Drug Administration rulings, and to make no conflicting recommendations.

Our guess is, that there will be numerous subsequent discussions on this particular subject.

Travelers and commuters by the tens of thousands who passed through New York's Pennsylvania Railroad Station during the month of March, were reminded by a large, three-section, lighted exhibit, that American welfare does actually rest on a thin layer of fertile soil. The display was placed in the station by the U.S.D.A., following arrangements made by committee men who administer the program of the Production and Marketing Administration in the states of Pennsylvania, New Jersey and New York.

AGRICULTURAL CHEMICALS



These men know farming, they know crops, they know Ded-Weed is a powerful, dependable weed killer . . . safe, easy-to-use and economical.

Ded-Weed is a product of the Mid-West, formulated especially for the crops, the climate and the farming conditions of this great farm belt. It's a quality product that attracts new business, repeat business and assures customer satisfaction and extra sales and profits for you.



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Crop-destroying, livestock-tormenting insects are quickly and effectively controlled with such Thompson-Hayward Insecticides as DED-TOX, DDT . . . TOXICHLOR®, Chlordane . . . TRI-6®, Benzene Hexachloride . . . PHENACIDE, Toxaphene, PHOSFUME, Parathion and many others.

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The Cotton Trade Journal

INTERNATIONAL ORGANIZATION OF THE COTTON INDUSTRY

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Editorial: Cotton Trade Journal